5-4120-308-15

TM 5-4120-308-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE MANUAL

AIR CONDITIONER, COMPACT VERTICAL, 208V, 3 PHASE, 18,000 BTUH COOLING: 12,000 BTUH HEATING, 50/60 HERTZ, AMERICAN AIR FILTER MODEL CH620-2,

FSN 4120-168-1781

This copy is a reprint which includes current pages from Changes 1 through 9.

HEADQUARTERS, DEPARTMENT OF THE ARMY

D 101.11:

READEX FICHE best copy available

SAFETY PRECAUTIONS

BEFORE OPERATION

Turn all controls off before power is connected. Insure proper power requirements are provided before operation. Be careful when working with high voltage. Contact with high voltage can result in serious injury or death. Never attempt repairs unless unit has been disconnected from power source. Ground air conditioner before operation.

Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas. Be especially careful that refrigerant does not come in contact with the eyes. In case of refrigerant leaks, ventilate the area immediately.

DURING OPERATION

Never attempt repairs during operation. In event of operating peculiarities, stop unit immediately and report condition to organizational maintenance. Be careful when working with high voltage. Contact with high voltage can result in serious injury or death.

Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas. Be especially careful that refrigerant does not come in contact with the eyes. In case of refrigerant leaks, ventilate the area immediately.

AFTER OPERATION

Be careful when working with high voltage. Contact with high voltage can result in serious injury or death.

Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas. Be especially careful that refrigerant does not come in contact with the eyes. In case of refrigerant leaks, ventilate the area immediately. When leak testing with Halide torch, insure adequate ventilation.

Wear goggles when repairing or servicing refrigerant system.

Never attempt repairs unless unit has been disconnected from the power supply. Do not attempt to repair a leak while system contains refrigerant. Exhaust all refrigerant from system to an outdoor area before beginning any refrigerant component repairs.

Wear rubber gloves when replacing a motor/compressor due to burnout. Acids may be present. Wear goggles when working on the refrigerant system.

Change
No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C., *17 July 1970*

Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual
AIR CONDITIONER, COMPACT VERTICAL, 208 V, 3 PHASE, 18,000 BTUH COOLING: 12,000 BTUH HEATING, 50/60 HERTZ, AMERICAN AIR FILTER MODEL CH620-2, FSN 4120-168-1781

TM 5-4120-308-15, 6 November 1969, is changed as follows:

Page 1. Refer to TM number at top of page. Change "TM 5-4120-20-308-15" to read "TM 5-4120-308-15."

Page 1-1. Paragraph 1-1 is superseded as follows:

1-1. Scope

a. This manual is published for use by personnel to whom the Model CH620-2 Air Conditioner is issued. Chapters 1 through 3 include description, operating instructions, and operator and organizational maintenance instructions. Chapters 5 and 6 provide instructions for direct support, general support, and depot maintenance.

b. Appendix A contains a list of publications applicable to this manual. Appendix B is a list of basic issue items authorized for the operator of this equipment. Appendix C contains the maintenance allocation chart.

c. Refer to TM 740-90-1 (Administrative Storage of Equipment) for information and instructions pertaining to organizational administrative storage.

d. Refer to TM 750-244-3 (Procedures for Destruction of Equipment to Prevent Enemy Use) for information and instructions on destruction of equipment to prevent enemy use.

Page 1-1. Paragraphs 1-4*a*(1) and (2) are superseded as follows:

(1) U.S. Army identification plate, located near top on rear panel, specifies nomenclature, manufacturer, military part number, serial number, contract number, FSN, weight and capacity.

(2) Service gage instruction plate, located below fresh air inlet screen, specifies removal of screen to facilitate installation of service gage hoses.

Page 1-2. Figure 1-1 is superseded as follows:

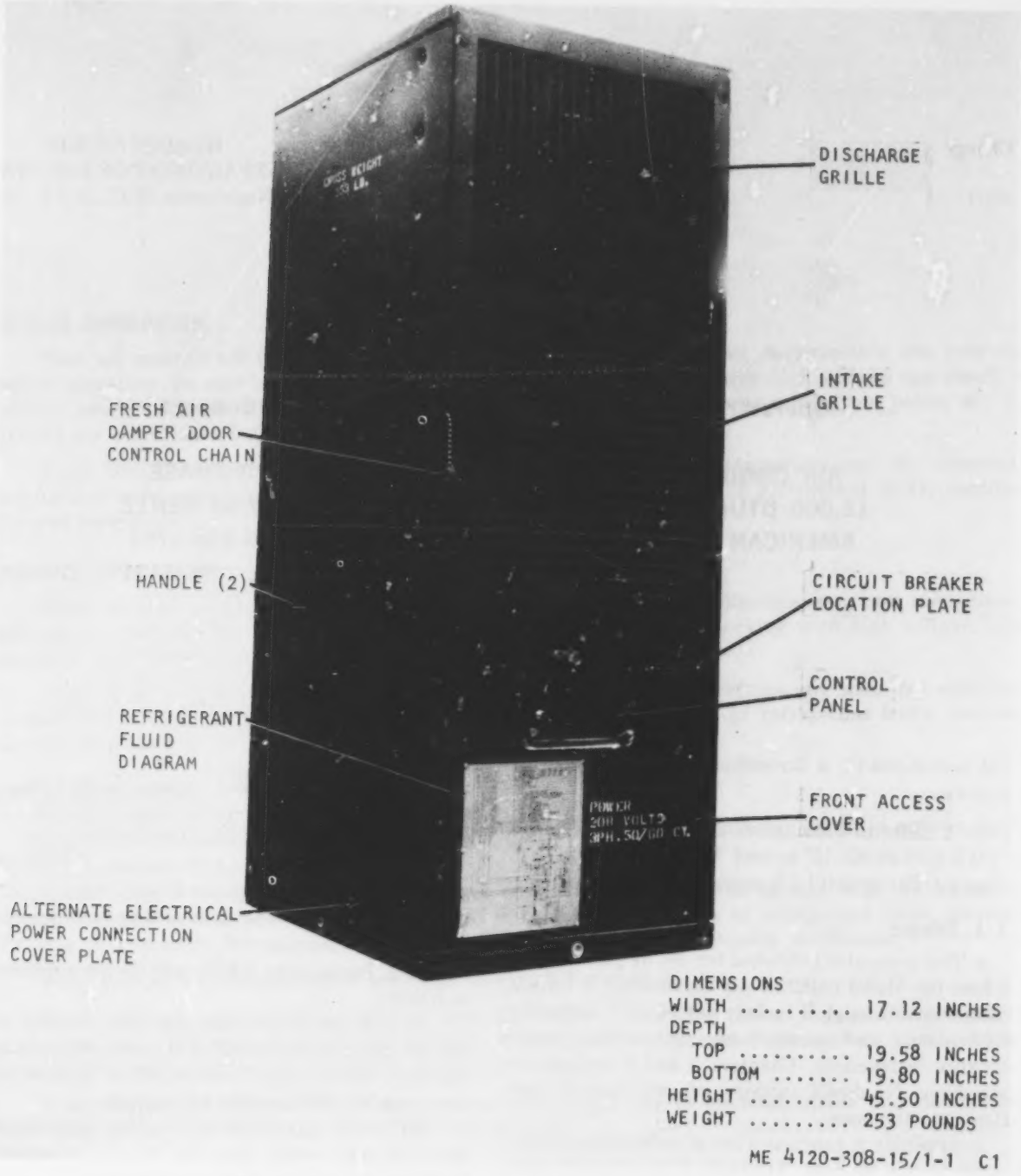


Figure 1-1. Air conditioner, right front three-quarter view, with shipping dimensions.

Page 1-4. Refer to paragraph 1-4*b*(1) and change paragraph title "Corps of Engineers plate" to read "U.S. Army Identification Plate." In lines 1 and 2, change "60 Hertz" to read "50/60 Hertz". Below "Stock No. ..... FSN 4120-168-1781" add the following: "Part Number ..... 13215E9850 (94703)."

Page 1-7. Refer to paragraph 1-4*b*(32) and change "Refrigerant charge ..... 7.5 lb" to read "Refrigerant charge ..... 9 lb."

Page 2-1. Paragraph 2-2*a* is superseded as follows:

a. General. Although the air conditioner is a self-contained unit, in certain installations it may be desireable to use a sound attenuator, remote control operation, and a canvas cover to prevent water and dust from entering the condenser section of the air conditioner.

Page 2-3. Add the following to paragraph 2-3*e*: In mobile applications, the unit must be adequately supported at the top. If desired, a 5/16 inch, 18 threaded hole is centered 2 inches from the top rear of unit, and may be utilized.

Page 2-3. "Note" below paragraph 2-3*g*(4) is superseded as follows:

NOTE

If required, the power connector receptacle (fig. 1-2) may also be relocated on the block-off panel assembly.

Page 2-6. Add "NOTE" at end of paragraph 2-7*d* as follows:

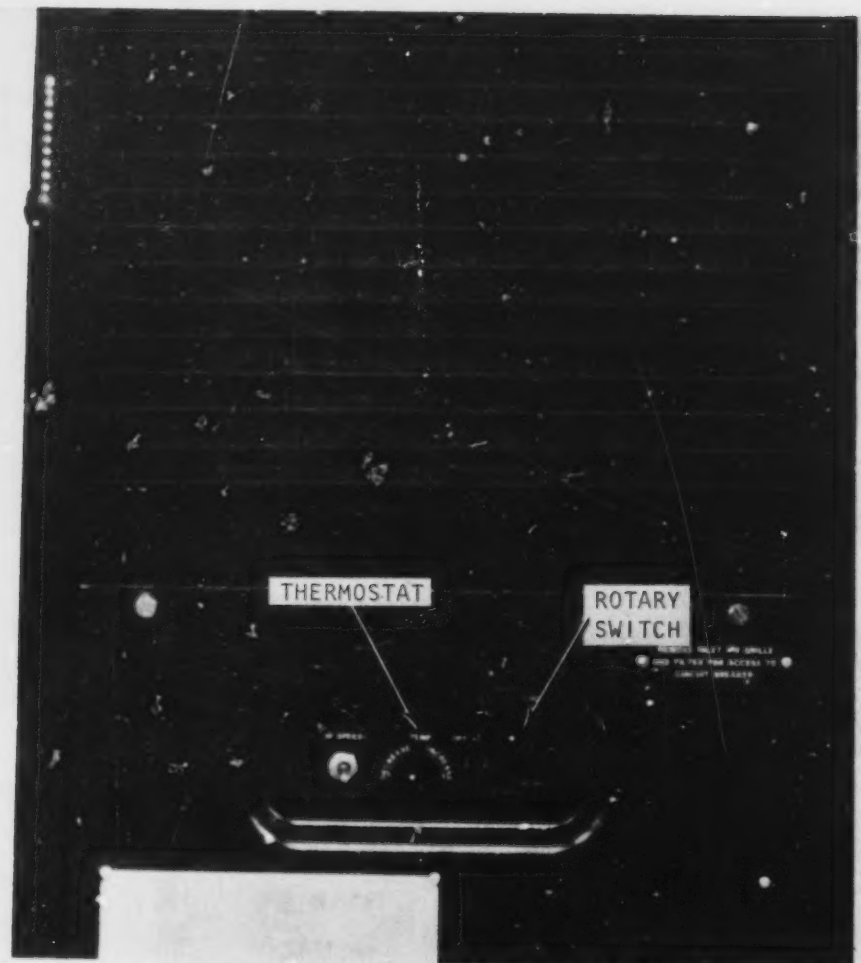
NOTE

Check sight glass during cooling mode only.

Page 2-6. In paragraph 2-7*e*, line 7. After the word "position" insert "with switch in LO-SPEED position."

Page 2-9. In paragraph 2-14, line 3, delete "mist eliminator."

Page 2-10. Figure 2-6 is superseded as follows:



STEP 1. POSITION THERMOSTAT FOR DESIRED TEMPERATURE.

STEP 2. PLACE ROTARY SWITCH ON COOL POSITION FOR COOLING OPERATION, ON LO HEAT OR HI HEAT POSITIONS FOR HEATING OPERATION, OR ON VENTILATION POSITION FOR VENTILATING OPERATION.

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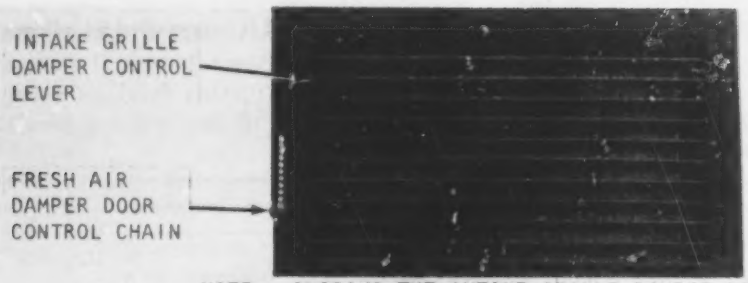
Figure 2-6. Starting instructions.

Page 2-12. Figure 2-8 is superseded as follows:



NOTE: CLOSING THE INTAKE GRILLE DAMPER CAUSES A GREATER PORTION OF THE TOTAL AIR FLOW TO BE DRAWN FROM THE OUTSIDE THROUGH DAMPER DOOR

A. COOLING OPERATION:
STEP 1. POSITION THERMOSTAT FOR DESIRED TEMPERATURE.
STEP 2. PLACE ROTARY SWITCH ON COOL POSITION.
STEP 3. FOR COOLING WITH 100 PERCENT RECIRCULATED AIR, CLOSE FRESH AIR DAMPER DOOR AND OPEN INTAKE GRILLE DAMPER.
STEP 4. FOR COOLING WITH FRESH MAKEUP AIR, OPEN FRESH AIR DAMPER DOOR AND PARTIALLY CLOSE INTAKE GRILLE DAMPER.
STEP 5. FOR COOLING WITH FRESH MAKEUP AIR DRAWN THROUGH CHEMICAL, BIOLOGICAL, FILTER UNIT WHEN OUTDOOR AIR IS CONTAMINATED. CLOSE FRESH AIR DAMPER DOOR AND OPEN INTAKE GRILLE DAMPER.

B. HEATING OPERATION:
STEP 1. POSITION THERMOSTAT FOR DESIRED TEMPERATURE.
STEP 2. PLACE ROTARY SWITCH ON LO HEAT OR HI HEAT POSITION.
STEP 3. FOR HEATING WITH 100 PERCENT RECIRCULATED AIR, CLOSE FRESH AIR DAMPER DOOR AND OPEN INTAKE GRILLE DAMPER.
STEP 4. FOR HEATING WITH FRESH MAKEUP AIR, OPEN FRESH AIR DAMPER DOOR AND PARTIALLY CLOSE INTAKE GRILLE DAMPER.
STEP 5. FOR HEATING WITH FRESH MAKEUP AIR DRAWN THROUGH CHEMICAL, BIOLOGICAL, FILTER UNIT WHEN OUTDOOR AIR IS CONTAMINATED, CLOSE FRESH AIR DAMPER DOOR AND OPEN INTAKE GRILLE DAMPER.

C. VENTILATING OPERATION:
STEP 1. PLACE ROTARY SWITCH IN VENTILATE POSITION.
STEP 2. FOR VENTILATING OPERATION, OPEN FRESH AIR DAMPER DOOR AND CLOSE INTAKE GRILLE DAMPER.

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Figure 2-8. Operating instructions.

Page 3-4. Table 3-1, first entry. Delete the X in weekly column for mist eliminator.

Page 3-4. In table 3-2, third entry, malfunction column. Change "Compressor shuts down during operation." to read "Insufficient air flow."

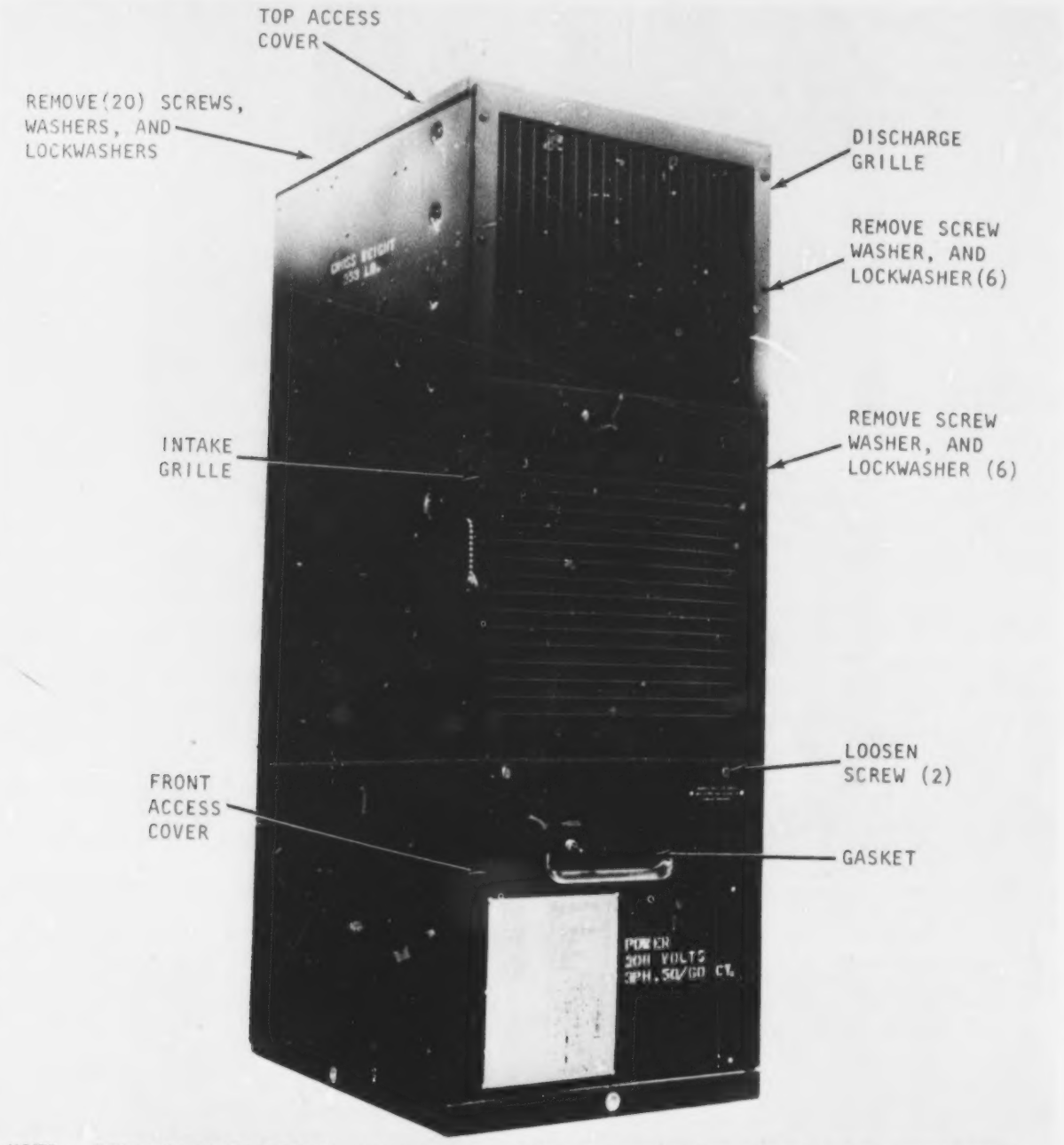
Page 3-6. Paragraph 3-19 is superseded as follows:

3-19. Testing of Radio Interference Suppression Components

Test the capacitors for leaks and shorts on a capacitor

tester; replace defective filter. If test equipment is not available and interference is indicated, replace the radio interference filter or cables with new components, one-by-one, until cause of interference is located and eliminated.

Page 3-8. Figure 3-4 is superseded as follows:



NOTE: REPLACE ACCESS PANEL INSULATION, FRONT ACCESS COVER GASKET, AND RIVET NUTS IF DAMAGED OR DEFECTIVE

ME 4120-308-15/3-4 C1

Figure 3-4. Discharge grille, intake grille, and front and top access covers, removal and installation.

Page 3-10. Paragraph 3-25*a*, last sentence. Change "Pull chain to open damper and release to close." to read "Pull chain to close damper and release to open."

Pages 4-1 and 4-2. Chapter 4 is rescinded.

Page 5-3. Table 5-1, tenth entry, Add *c* paragraph to Probable Cause column and to Corrective Action column as follows:

Malfunction	Probable cause	Corrective action
10. System losing cooling capacity.	*a.* Suction or discharge pressure not correct.	*a.* Check suction and discharge pressures (table 5-2 and para 6-6).
	b. Ice on coil.	*b.* Check pressure regulating valve.
	c. Solenoid valves defective.	*c.* Refer to paragraph 5-14 and paragraph 5-15.

Page 5-7. Paragraph 5-14*b* is superseded as follows:

b. Testing.

(1) *Air conditioner in cool cycle.*

(a) Disconnect power cable. Remove front access cover (fig. 3-4), junction box (fig. 3-12), and when accessible, remove the handle (fig. 1-1).

(b) Reconnect power cable, and start air conditioner (para 2-8).

(c) Move selector switch to "cool," and turn thermostat to maximum decrease position. The valve is open (not energized) during the cooling cycle.

(d) The inlet and outlet piping on the valve will feel warm-to-hot to the touch. Very little temperature difference will be noticed if valve is operating satisfactorily.

(2) *Air conditioner in bypass cycle.*

(a) With selector switch on "cool," turn thermostat to maximum increase (clockwise) position. This will energize (close) valve, and click will be noticed.

(b) If valve is functioning properly, the flow of refrigerant will stop, and the temperature of the inlet and outlet piping to the valve will decrease.

(3) *Valve testing.* The valve is open during the cooling cycle, and is closed when in the bypass cycle. Voltage should be indicated at valve only during bypass cycle. Refer to figure 1-4 for test points. Voltage is 24 VDC. If voltage is indicated, check continuity of coil. Replace valve if valve is malfunctioning, i.e., sticks open, does not seat properly, does not close, or does not click when energized.

Page 5-7. Paragraph 5-15*a* is superseded as follows:

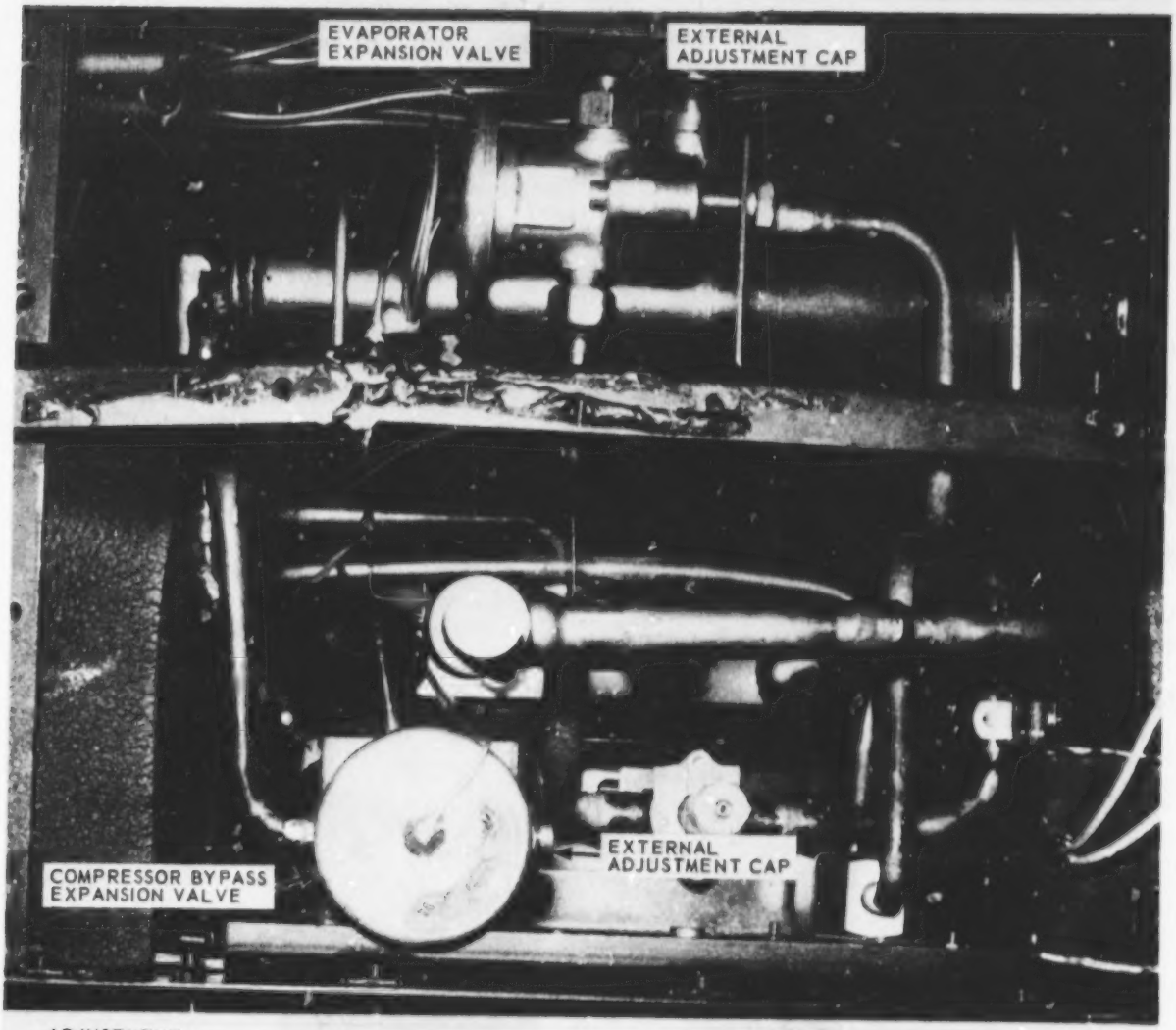
a. General. The pressure equalizer solenoid valve is a normally open solenoid valve, installed in the system to insure rapid pressure equalization during the compressor off cycle. The valve is closed (energized) during both the cooling and the bypass cycles of operation. It opens when the compressor is not operating.

Page 5-8. Paragraph 5-15*b*(3) is superseded as follows:

(3) Start the air conditioner (para 2-8). With selector switch on "cool", the valve closes, and a click is noticed. Replace valve if it fails to close, sticks open, or does not seat properly.

Page 5-13. Figure 5-9 is superseded as follows:

CAUTION: NEVER ADJUST THE EXPANSION VALVE UNLESS IT IS ABSOLUTELY NECESSARY. WHEN ADJUSTING THE EXPANSION VALVE, ALLOW AT LEAST 20 MINUTES BETWEEN EACH ADJUSTMENT. ADJUST EVAPORATOR EXPANSION VALVE DURING COOLING CYCLE ONLY (THERMOSTAT IN MAXIMUM DECREASE POSITION) AND SELECTOR SWITCH ON COOL. ADJUST BYPASS EXPANSION VALVE DURING BYPASS CYCLE ONLY (THERMOSTAT IN MAXIMUM INCREASE POSITION)WITH SELECTOR SWITCH ON COOL.



ADJUSTMENT:

STEP 1. TAPE THE BULB OF A THERMOMETER TO SUCTION TUBE NEAR SENSING ELEMENT. INSULATE THERMOMETER BULB.
STEP 2. INSTALL A SUITABLE PRESSURE GAGE AT SUCTION TUBE SERVICE VALVE.
STEP 3. OPERATE THE UNIT FOR APPROXIMATELY 30 MINUTES (THERMOMETER READING MUST STABILIZE).
STEP 4. CHECK THERMOMETER AND PRESSURE GAGE READINGS. COMPARE READINGS WITH FIGURE 5-10 THERMOMETER READING SHOULD BE APPROXIMATELY 10°F HIGHER THAN TEMPERATURE GIVEN ON FIGURE.
STEP 5. REMOVE CAP AND TURN ADJUSTING SCREW TWO TURNS CLOCKWISE TO INCREASE SUPERHEAT 1°F OR TWO TURNS COUNTERCLOCKWISE TO DECREASE SUPERHEAT. INSTALL CAP.
NOTE: FACTORY SET SUPERHEATS ARE:
EVAPORATOR EXPANSION VALVE, 6(±1.5)°F.
COMPRESSOR BYPASS EXPANSION VALVE, 25(±1.5)°F.

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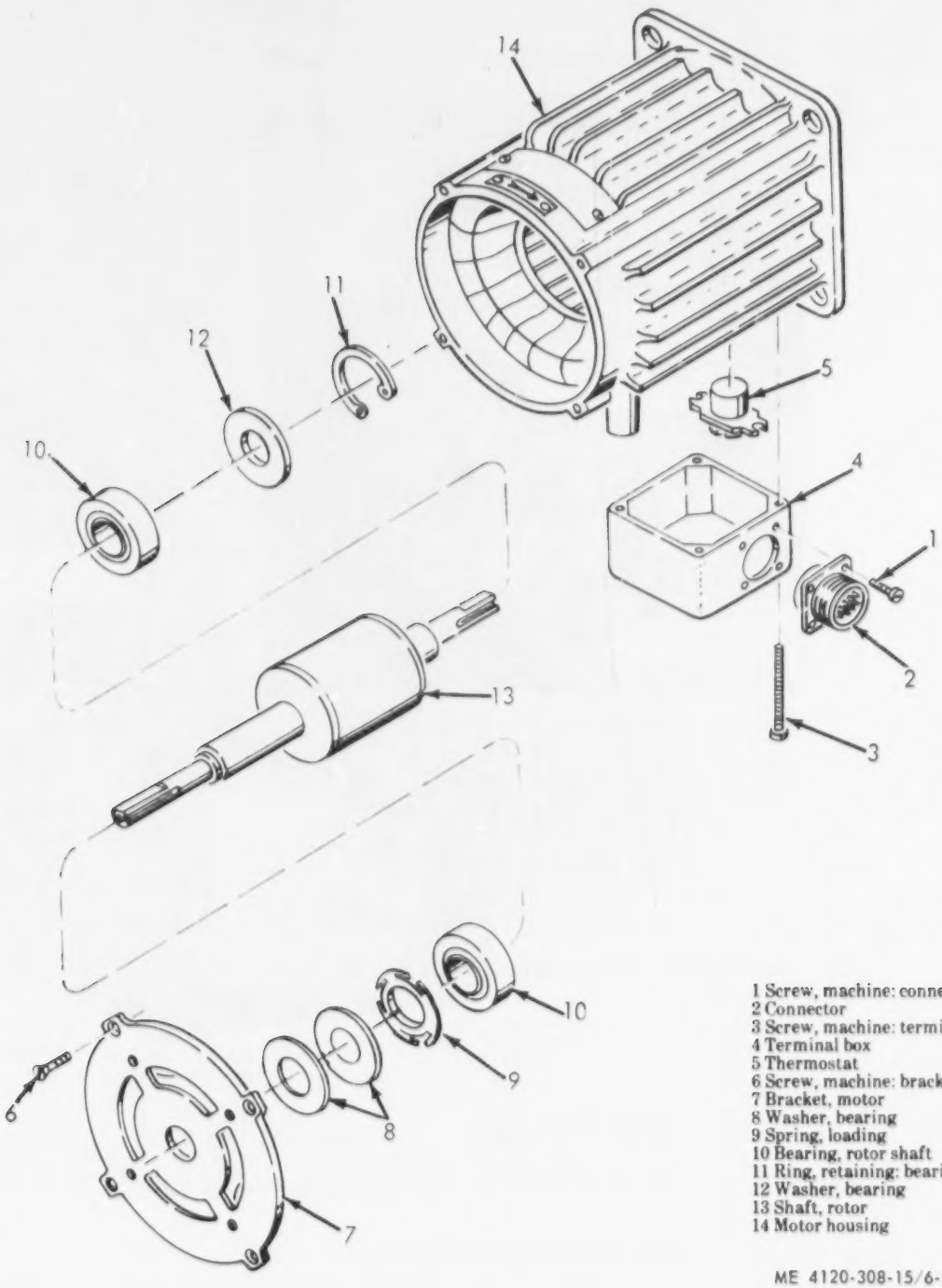
Figure 5-9. Expansion valve adjustment.

Page 5-17. Paragraph 5-24*b* is superseded as follows:

b. Testing. With pressure gauges installed and discharge pressure below 350 ± 16 psig, check for continuity between terminals 2 of fuse block (XF2) and (X2) of armature relay (K4). Continuity should not be indicated. If continuity is indicated, switch is defective and must be replaced.

Page 6-4. Figure 6-2 is superseded as follows:



1 Screw, machine: connector mounting
2 Connector
3 Screw, machine: terminal box mtg
4 Terminal box
5 Thermostat
6 Screw, machine: bracket mtg
7 Bracket, motor
8 Washer, bearing
9 Spring, loading
10 Bearing, rotor shaft
11 Ring, retaining: bearing
12 Washer, bearing
13 Shaft, rotor
14 Motor housing

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Figure 6-2. Motor, disassembly and reassembly.

Page 6-6. Figure 6-4 is superseded as follows:

STEP 1. REFER TO FIGURE 3-6 AND REMOVE THE FRESH AIR INLET SCREEN.

STEP 2. REMOVE CAPS FROM SERVICE VALVES.

STEP 3. CONNECT HOSE FROM DISCHARGE PRESSURE GAUGE ON MANIFOLD LOOSELY TO DISCHARGE SERVICE VALVE. PURGE HOSE AND TIGHTEN CONNECTION AT SERVICE VALVE.

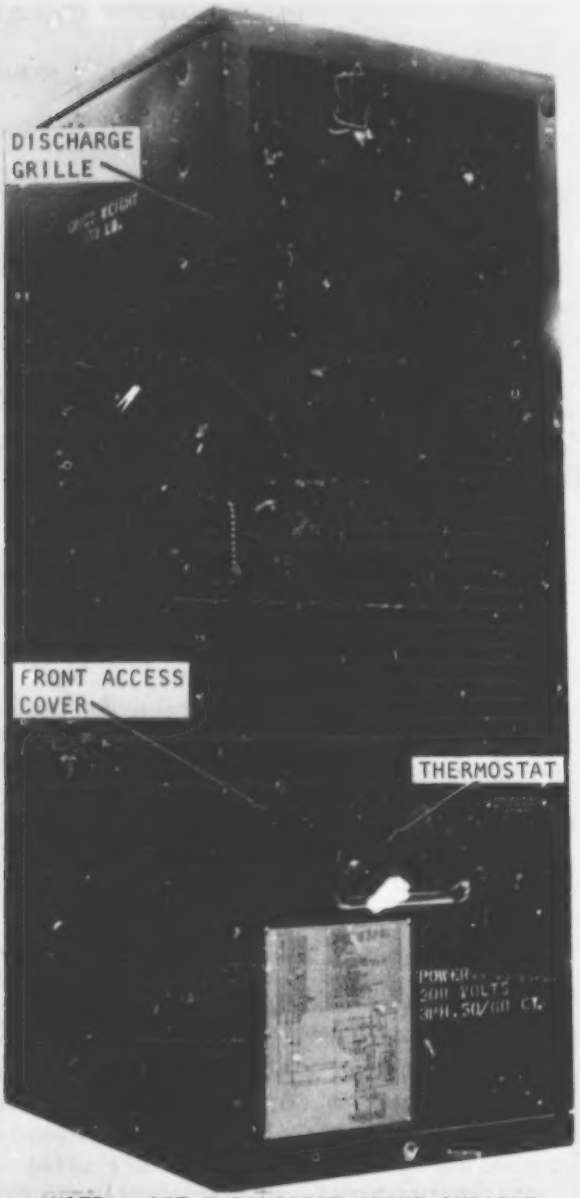
NOTE: HOSES MUST HAVE VALVE CORE DEPRESSORS.

WARNING: AVOID BODILY CONTACT WITH LIQUID REFRIGERANT AND AVOID INHALING REFRIGERANT GAS. BE ESPECIALLY CAREFUL THAT REFRIGERANT DOES NOT CONTACT THE EYES. IN CASE OF REFRIGERANT LEAKS, VENTILATE THE AREA IMMEDIATELY. WEAR GOGGLES WHEN SERVICING REFRIGERANT SYSTEM.

ME 4120-308-15/6-4 (1)

Figure 6-4. Pressure testing and evacuating the refrigerant system.

Page 6-11. Figure 6-5 is superseded as follows:



NOTE: SET THERMOSTAT ABOVE AMBIENT OR ROOM TEMPERATURE

STEP 4. OPEN REFRIGERANT DRUM SHUTOFF VALVE AND CLOSE SUCTION SERVICE VALVE. OEPRATE UNIT (PAR. 2-8) AND WEIGH IN 7.5 LB CHARGE OF REFRIGERANT-22. CONTINUE ADDING REFRIGERANT SLOWLY UNTIL SIGHT GLASS INDICATES FULL (CLEAR)

NOTE: OPERATE UNIT IN COOL POSITION ONLY DURING SERVICING OPERATION.

STEP 5. PARTIALLY BLOCK DISCHARGE GRILLE WITH A CARDBOARD BAFFLE. ADJUST BAFFLE UNTIL SUCTION PRESSURE GAUGE READS 55 PSIG. CONTINUE ADDING REFRIGERANT SLOWLY, WHILE MAINTAINING 55 PSIG SUCTION PRESSURE BY ADJUSTING THE BAFFLE, UNTIL THE DISCHARGE PRESSURE GAUGE INDICATION CORRESPONDING TO THE AMBIENT TEMPERATURE IS OBTAINED.

STEP 6. CLOSE SERVICE VALVES AND CLOSE REFRIGERANT DRUM SHUTOFF VALVE. STOP THE UNIT (PAR. 2-10). DISCONNECT MANIFOLD HOSES FROM SERVICE VALVES. INSTALL CAPS (STEP 2) AND SCREEN (STEP 1).

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Figure 6-5 Charging the refrigerant system.

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

To be distributed in accordance with DA Form 12-25, Section III, (qty rqr block No. 542) organizational maintenance requirements fo
Air Conditioners: 18,000 BTU, Compact.

TM 5-4120-308-15
C 2

Change
No. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D. C., *1 November 1971*

Operator, Organizational, Direct Support, General Support and Depot Maintenance Manual AIR CONDITIONER, COMPACT, VERTICAL, 208 V, 3 PHASE, 18,000 BTUH COOLING: 12,000 BTUH HEATING, 50/60 HERTZ, AMERICAN AIR FILTER MODEL CH620-2, FSN 4120-168-1781

TM 5-4120-308-15, 6 November 1969, is changed as follows:

Page 1-1. In section II, paragraph 1-3*a*, line 1, change "conditioner fig. 1-1" to read: "conditioner (fig. 1-1").

Page 1-4. In paragraph 1-4*b*(9), line 7, change "Compressor start relay (K2) and heater relay (K1)." to read "Compressor start relay (K1) and Heater relay (K2)."

Add paragraph 1-4*b*(9.1) after 1-4*b*(9).

(9.1) *Semiconductor diode (CR2).*

Manufacturer	General Electric
Type	Silicon

Page 1-5. In paragraph 1-4*b*(14), line 4, change "5(± 10) psi" to read "50 (+ 10) psi"

In paragraph 1-4*b*(15), line 5, delete the following "and 400", so line reads: 208v, 60 Hertz, 3-phase resistive load."

In paragraph 1-4*b*(24), change part number "TCL100HW100" to read "TCLE100HW100-6A."

In paragraph 1-4*b*(25), change title from "Condenser bypass expansion valve" to read (25) Compressor bypass expansion valve," change part number from "TCL75C15B" to read "TCL75CL-15A".

Page 1-7. In paragraph 1-4*b*(32), line 4, change "7.5 lbs" to read "11 lbs."

Page 2-1. Paragraph 2-2*a* is superseded as follows:

a. General. Although the air conditioner is a self-contained unit, in certain installations it may be desirable to use a sound attenuator, remote control operation, and canvas cover to prevent water and dust from entering the condenser section.

Paragraph 2-2*c*(2.1) is added after 2-2*c*(2).

(2.1) Remove junction box.

Page 2-3. Paragraph 2-3*e* is superseded as follows:

e. Installing Unit. Bolt unit to floor or other flat surface. Refer to base plan (fig. 1-3) for dimensions. Remove the three outside drain plugs (fig. 1-2). Attach a four-foot-long drain hose, 5/16 in id to each of the three drain connections. Tilt unit one to two degrees toward usable drains.

Page 3-3. In paragraph 3-9*a*, line 4, change "10-ampere" to read "1.6-ampere."

In paragraph 3-9*c*(1), lines 1-2, change "10-ampere" to read "1.6-ampere."

Page 3-4. In paragraph 3-10, table 3-2, line 2*a* is superseded as follows:

2. Compressor fails to start. *a.* Power line failure/ Phase reversal.

a. Restore power/check phasing.

Page 3-7. Figure 3-3 is superseded as follows:

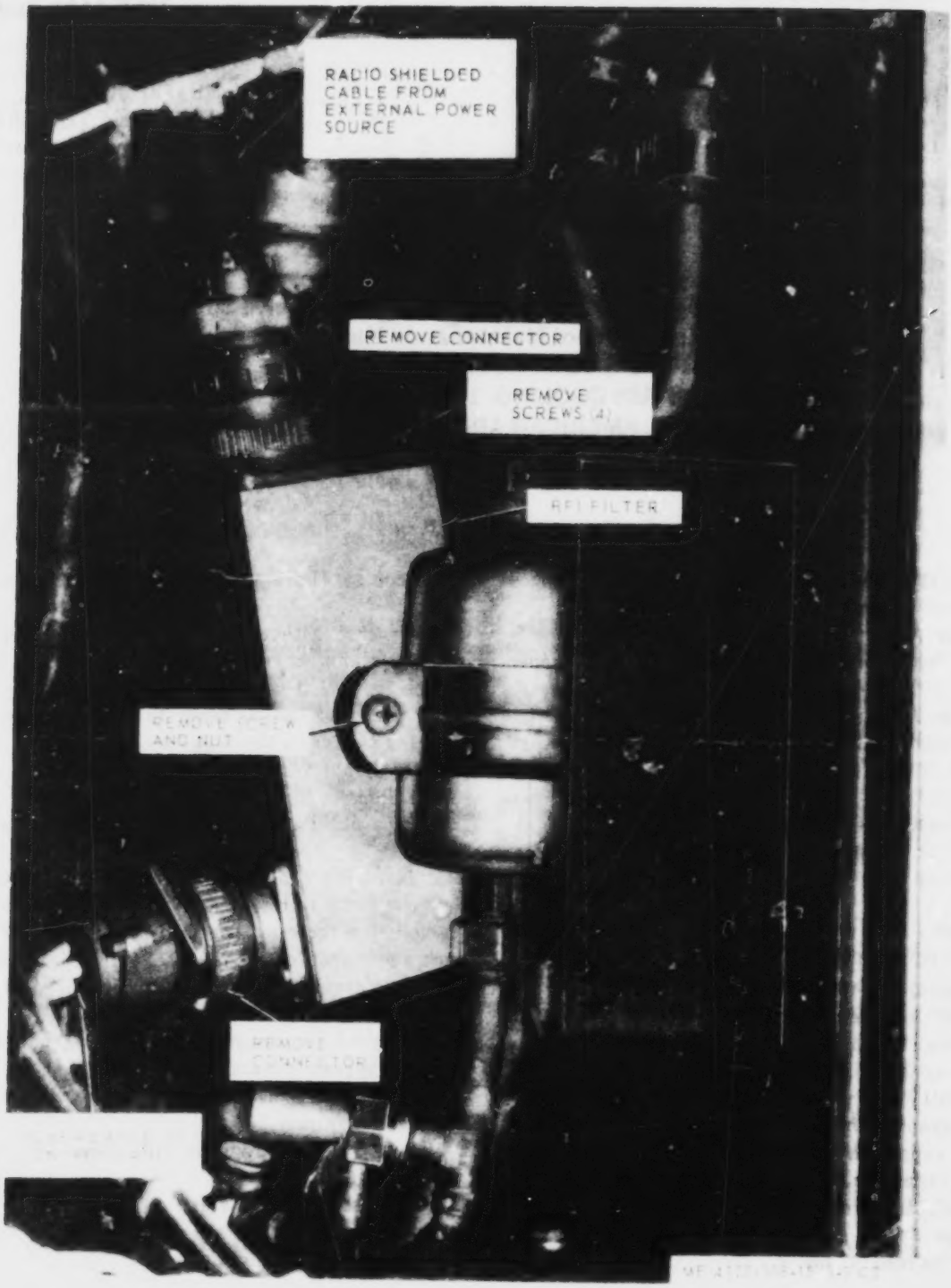


Figure 3-3. Radio interference suppression components.

Page 3-10. In paragraph 3-25 the title is superseded as follows:

3-25. Fresh Air Damper Door Assembly and Control Chain.

In paragraph 3-25*b* is superseded as follows:

b. Inspect. Inspect for broken chain and damaged hinge, and repair as necessary.

Page 3-13. In paragraph 3-28*b*(1), line 1, change "With power and" to read "With power off and"

Page 3-14. Paragraph 3-30*a* is superseded as follows:

3-30. Junction Box and Support Board.

a. General. The junction box is located at the bottom front of the air conditioner. Access is gained by removing the front access cover. The electrical component support board is mounted in the junction box and supports the phase sequence relay, armature relays, compressor start relay, heater relay, time delay relay, semiconductor diode, circuit breaker, rectifier, terminal boards, and fuse holders and fuses.

Page 3-16. **Figure 3-11 is superseded as follows:**

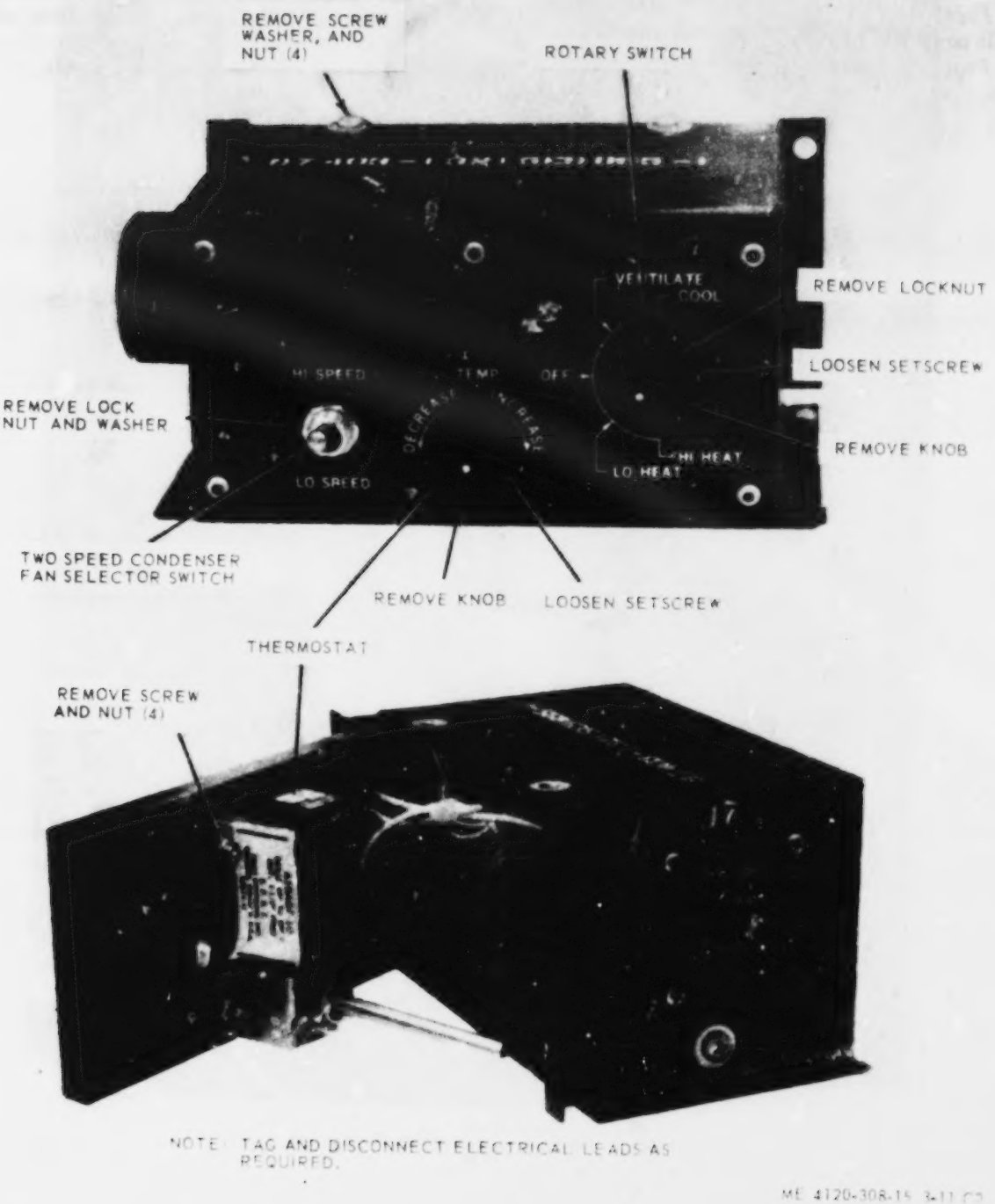


Figure 3-11. Control panel, disassembly and reassembly

Page 3-17. Add paragraph 3-30*b*(3) after 3-30*b*(2), as follows:

(3) Refer to figure 3-13 and remove support board as follows:

(a) Remove screws (6) attaching circuit breaker to junction box. Push circuit breaker lever back into the junction box.

(b) Remove ground wire bolt and nut, and tag leads.

(c) Remove bolts and nuts attaching receptacles (2) to the rear of the junction box.

(d) Remove and tag leads from transformer T1 to rectifier terminals.

(e) Remove screws (8) from rear of junction box releasing the electrical components support board.

(f) Lift components support board from junction box turning so that transformer terminals H1 and H2 are exposed for access.

(g) Disconnect and tag leads to terminals H1 and H2.

(h) Remove components, as necessary, tagging all leads.

Paragraph 3-31*a*(3)(*b*.1) is added after 3-31*a*(3)(*b*).

(b.1) Remove junction box (fig. 3-12).

Paragraph 3-31*a*(3)(*c*) is superseded as follows:

(c) Refer to paragraph 3-30*b*(3) and remove component support board and then relay.

Page 3-18. Figure 3-13 is superseded as follows:

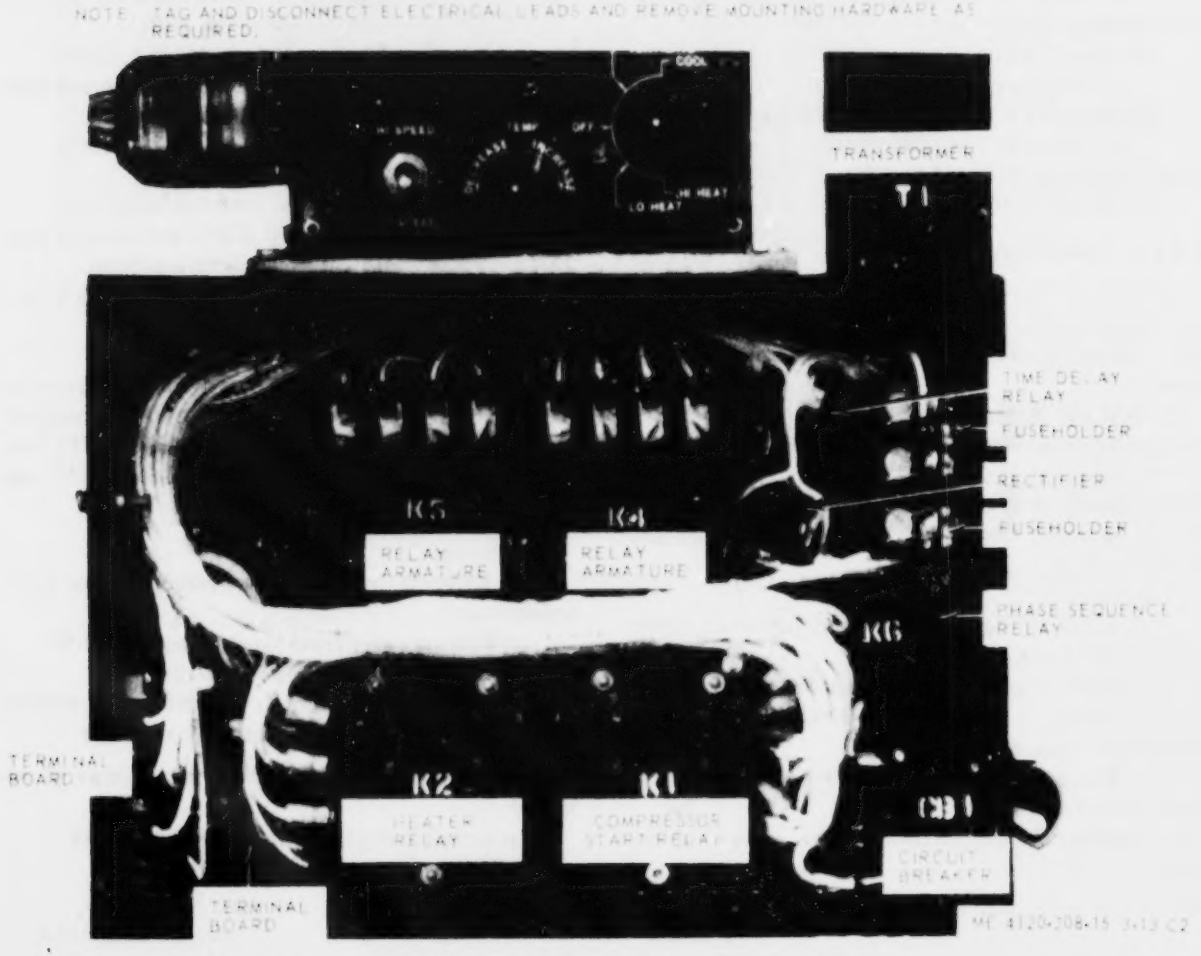


Figure 3-13. Phase sequence relay, circuit breaker, rectifier, compressor start relay, armature relay, heater relay, time delay relay, fuse and fuse holder, and terminal board, removal and installation

Page 3-19. Paragraph 3-31*b*(3)(*b.1*) is added after 3-31*b*(3)(*b*).

(*b.1*) Remove junction box (fig. 3-12).

Paragraph 3-31*b*(3)(*c*) is superseded as follows:

(*c*) Refer to paragraph 3-30*b*(3) and remove component support board and then relay.

Paragraph 3-31*c*(3)(*b*) is superseded as follows:

(*b*) Remove cover from junction box (fig. 3-10).

Paragraph 3-31*c*(3)(*b.1*) is added after 3-31*c*(3)(*b*).

(*b.1*) Remove junction box (fig. 3-12).

Paragraph 3-31*c*(3)(*c*) is superseded as follows:

(*c*) Refer to paragraph 3-30*b*(3) and remove component support board and then relay.

Page 3-20. Paragraph 3-31*d*(3)(*b.1*) is added after 3-31*d*(3)(*b*).

(*b.1*) Remove junction box (fig. 3-12).

Paragraph 3-31*d*(3)(*c*) is superseded as follows:

(*c*) Refer to paragraph 3-30*b*(3) and remove component support board and then relay.

Paragraph 3-31*e*(3)(*b.1*) is added after 3-31*e*(3)(*b*).

(*b.1*) Remove junction box (fig. 3-12)

Paragraph 3-31*e*(3)(*c*) is superseded as follows:

(*c*) Refer to paragraph 3-30*b*(3) and remove component support board and then relay.

Paragraph 3-31.1 is added after 3-31.

3-31.1. Semiconductor Diode.

a. General. The diode (CR2 Fig. 1-4) is incorporated into the electrical circuit to act as an arc suppressor when pressure switch S3 and toggle switch S8 are energized.

b. Testing. Remove diode from relay (K4). Set ohmmeter on low scale (X1) and measure resistance of (+) probe to anode, (—) probe to cathode, resistance should be low. Reverse probes, the resistance should be high. Observe polarity when replacing a defective diode.

c. Removal.

(1) Refer to figure 3-4, and remove the lower front access cover.

(2) Remove cover from junction box (fig. 3-10).

(3) Refer to paragraph 3-30*b*(3), and remove component support board.

(4) Tag and remove wires from diode, and remove diode from support board.

d. Installation. Installation is the reverse of removal.

Paragraph 3-32*c*(2) is superseded as follows:

(2) Remove cover from junction box (fig. 3-10).

Paragraph 3-32*c*(2.1) is added after 3-32*c*(2).

(2.1) Remove junction box (fig. 3-12).

Paragraph 3-32*c*(3) is superseded as follows:

(3) Refer to paragraph 3-30*b*(3) and remove component support board and then circuit breaker.

Page 3-21. In paragraph 3-33*b*(2) change "(2) check voltage between terminals 1 and 4. 30 vac should be indicated." to read "(2) Check voltage between yellow (ac) terminals 1 and 4. Thirty vac should be indicated."

Paragraph 3-33*c*(2.1) is added after 3-33*c*(2).

(2.1) Remove junction box (fig. 3-12).

Paragraph 3-33*c*(3) is superseded as follows:

(3) Refer to paragraph 3-30*b*(3) and remove component support board and then rectifier.

Paragraph 3-34*c*(2.1) is added after 3-34*c*(2).

(2.1) Remove junction box (fig. 3-12).

Paragraph 3-34*c*(3) is superseded as follows:

(3) Refer to paragraph 3-30*b*(3) and remove component support board and then transformer.

Paragraph 3-35*b*(2.1) is added after 3-35*b*(2).

(2.1) Remove junction box (fig. 3-12).

Paragraph 3-35*b*(3) is superseded as follows:

(3) Refer to paragraph 3-30*b*(3) and remove component support board and then terminal board.

Paragraph 3-35.1 is added after paragraph 3-35.

3-35.1. Fuse Holders

a. General. Two separate fuse holders mounted in the upper right corner of the junction box support board contain the three fuses. Fuse holder XF1 contains two 1.5-ampere fuses, the fuse holder XF2 contains one 5-ampere fuse.

b. Removal.

(1) Refer to figure 3-4 and remove lower front access cover.

(2) Remove cover from junction box (fig. 3-10).

(3) Remove junction box (fig. 3-12).

(4) Refer to paragraph 3-30*b*(3) and remove component support board and then fuse holder.

c. Installation. Installation is the reverse of removal.

Paragraph 3-36*b*(2) is superseded as follows:

(2) Disconnect power plug from motor.

Page 3-22. **Figure 3-14 is superseded as follows:**

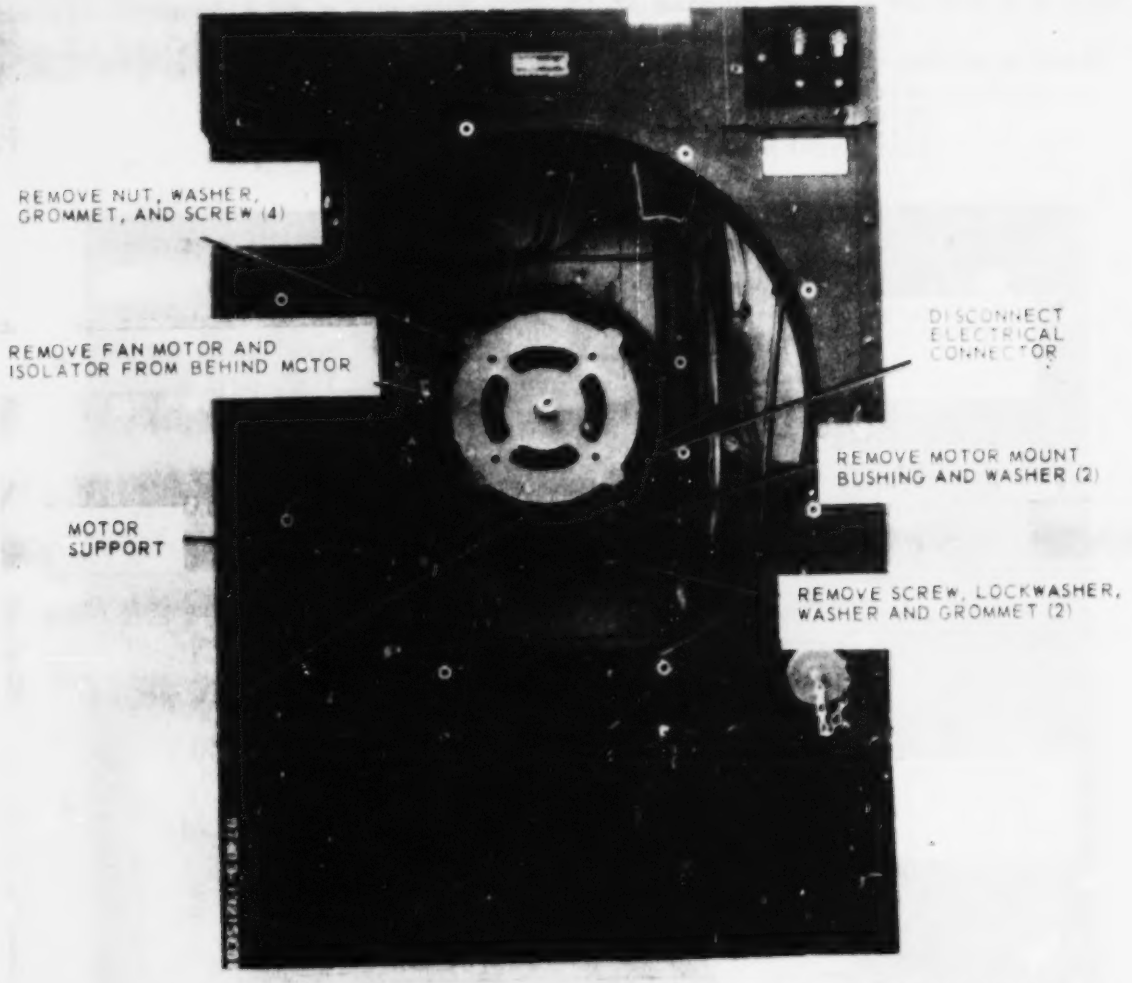

REMOVE NUT, WASHER, GROMMET, AND SCREW (4)
REMOVE FAN MOTOR AND ISOLATOR FROM BEHIND MOTOR
MOTOR SUPPORT
DISCONNECT ELECTRICAL CONNECTOR
REMOVE MOTOR MOUNT BUSHING AND WASHER (2)
REMOVE SCREW, LOCKWASHER, WASHER AND GROMMET (2)
NOTE: WHEN REASSEMBLING, TILT MOTOR AND START ALLEN HEAD SCREWS FIRST, THEN INSERT FOUR REMAINING SCREWS.
CAUTION: PROPER CLEARANCES ARE REQUIRED TO OBTAIN PROPER ALIGNMENT OF FANS IN INLET RINGS AND CASING. REPLACE BUSHING WITH SAME SIZE. IF FANS DO NOT ALIGN PROPERLY USE A DIFFERENT THICKNESS BUSHING AS REQUIRED.
ME 4120-306-15 3-14 C2

Figure 3-14. Fan motor, removal and replacement.

Page 3-24. Add sentence at end of paragraph **3-41*b*(2) as follows:**

If it does not exist, switch is defective and must be replaced.

In paragraph 3-42*a*, line 5, change "loss of evaporator air" to read "contamination of evaporator air."

Page 4-2. **In paragraph 4-4, line 7, change "proper maintenance echelon" to read "proper maintenance level."**

Page 5-3. The title of Table 5-2 is superseded as follows.

Table 5-2. Normal Operating Pressures, Fan Speed on High

Add paragraph 5-9*a*(4.1) after 5-9*a*(4).

5-9*a*(4.1). Melt solder on refrigerant inlet and outlet tubes, and disconnect.

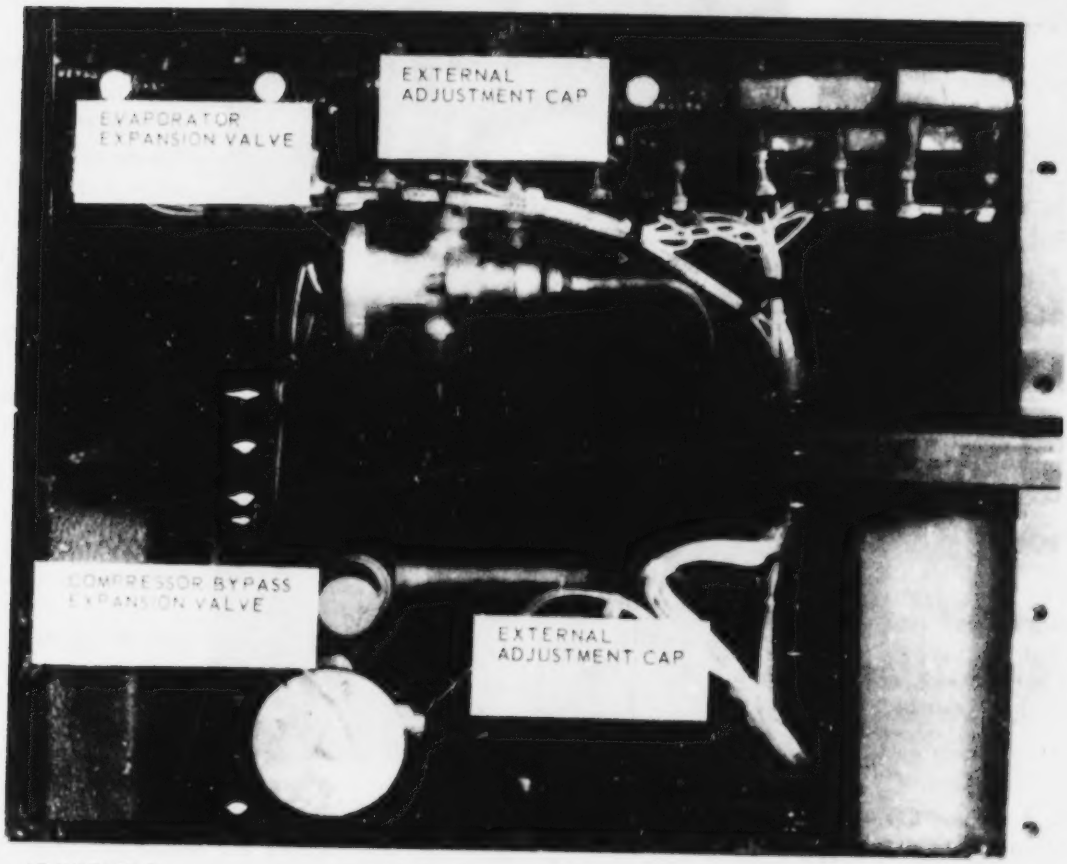
Page 5-7. **In paragraph 5-13*b*(3), line 3, change "counterclockwise" to read "clockwise."**

Page 5-9. Paragraph 5-16*a*(4) is superseded as follows:

(4) Replace complete valve if internal parts are defective.

Page 5-13. Figure 5-9 is superseded as follows:

CAUTION: NEVER ADJUST THE EXPANSION VALVE UNLESS IT IS ABSOLUTELY NECESSARY. WHEN ADJUSTING THE EXPANSION VALVE, ALLOW AT LEAST 20 MINUTES BETWEEN EACH ADJUSTMENT. THIS TIME ELEMENT IS VERY IMPORTANT AND MUST BE OBSERVED.



ADJUSTMENT:
STEP 1. TAPE THE BULB OF A THERMOMETER TO SUCTION TUBE NEAR SENSING ELEMENT. INSULATE THERMOMETER BULB.
STEP 2. INSTALL A SUITABLE PRESSURE GAGE AT SUCTION TUBE SERVICE VALVE.
STEP 3. OPERATE THE UNIT FOR APPROXIMATELY 30 MINUTES (THERMOMETER READING MUST STABILIZE).
STEP 4. CHECK THERMOMETER AND PRESSURE GAGE READINGS. COMPARE READINGS WITH FIGURE 5-10. THERMOMETER READING SHOULD BE APPROXIMATELY 10 F HIGHER THAN TEMPERATURE GIVEN ON FIGURE.
STEP 5. REMOVE CAP AND TURN ADJUSTING SCREW TWO TURNS CLOCKWISE TO INCREASE SUPERHEAT 1°F OR TWO TURNS COUNTERCLOCKWISE TO DECREASE SUPERHEAT. INSTALL CAP.
NOTE: FACTORY SET SUPERHEATS ARE:
EVAPORATOR EXPANSION VALVE, 6(±1.5)°F.
COMPRESSOR BYPASS EXPANSION VALVE, 15(±1.5)°F.

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Figure 5-9. Expansion valve adjustment.

Page 5-16. Add paragraph 5-21*b*(5) after 5-21*b*(4).

(5) Remove the mounting brackets.

Page 5-17. Paragraph 5-24*b* is superseded as follows:

b. Testing. With pressure gauges installed and discharge pressure below actuating pressure of switch disconnect plug P3 from receptacle J3, and check continuity between pins "0" and "g" on plug P3. No continuity should be indicated. If indicated, switch is defective.

Page 5-18. Figure 5-14 is superseded as follows:

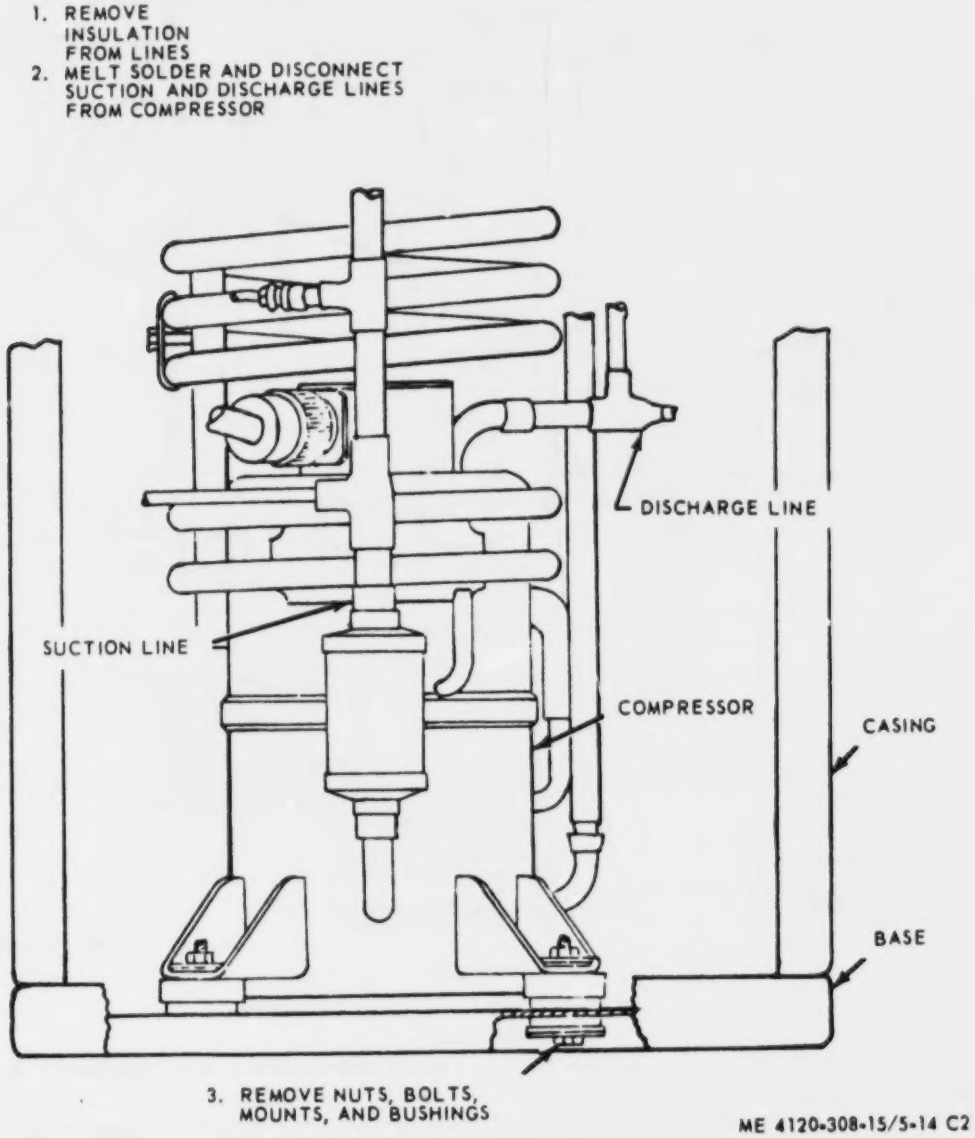


Figure 5-14. Compressor, removal and installation.

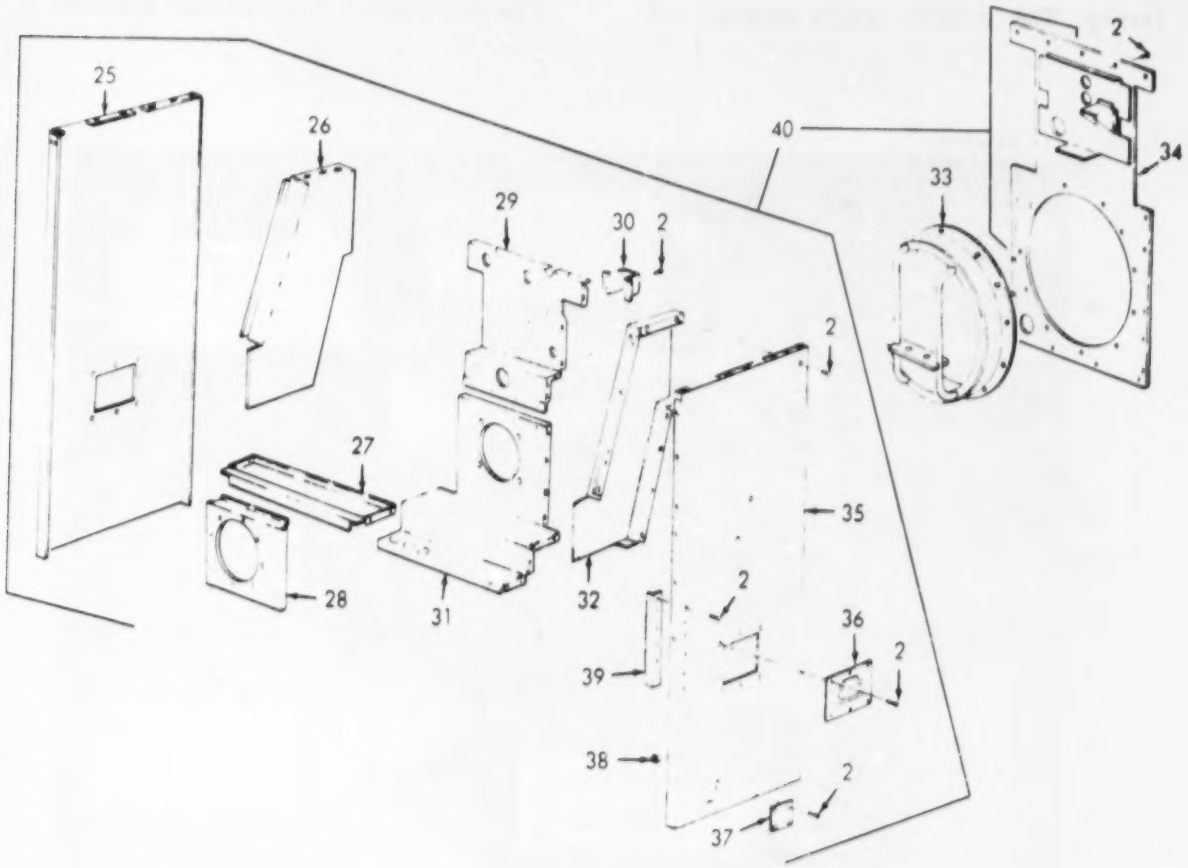
Page 5-18. Paragraph 5-26.1 is added after 5-26.

5-26.1. Motor Support and Cone Assembly

a. Removal. Refer to figure 5-16 (sheet 2 of 2), and remove the motor support and cone assembly from the casing assembly.

b. Installation. Installation is the reverse of removal.

Page 5-21. Figure 5-16 (sheet 2 of 2) is superseded as follows:



25. LEFT SIDE PANEL
26. LEFT DUCT
27. DRAIN PAN
28. INTAKE PANEL
29. TOP PARTITION PANEL
30. PRESSURE REGULATOR VALVE BRACKET
31. PARTITION PANEL
32. RIGHT DUCT
33. MOTOR SUPPORT AND CONE ASSEMBLY
34. BACK PANEL
35. RIGHT SIDE PANEL
36. HANDLE (2 REQD)
37. BLOCKOFF PLATE
38. NUT
39. FILTER SUPPORT
40. CASING ASSEMBLY

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Figure 5-16. Base, casing, and duct removal and installation (sheet 2 of 2).

Page 6-2. Figure 6-1 is superseded as follows:

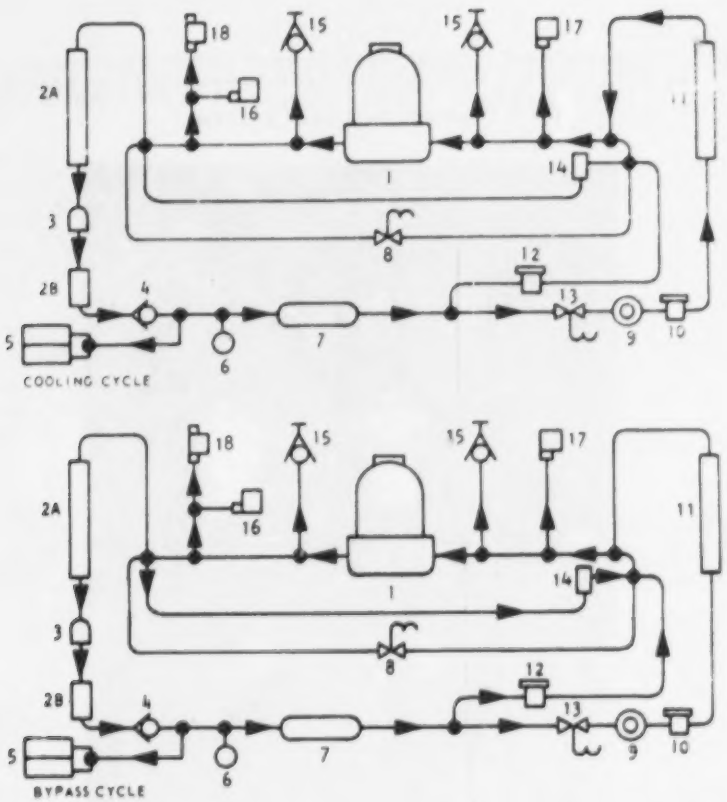


Figure 6-1. Refrigerant flow diagram

Page 6-3. Paragraph 6-3*a* is superseded as follows:

a. If the system must be opened for repair or replacement of parts, connect a hose line to the suction service valve and purge the refrigerant to an outside area.

In paragraph 6-5*a*(1), line 2, change "preferred method" to read "one method."

Paragraph 6-5*a*(2) is superseded as follows:

(2) With system pressurized (+ 50 psig), brush all possible points of leakage with soap solution and watch for bubbles. Wipe off soap solution, and mark leaks. Drain the refrigerant system; repair leaks and pressure test the system.

Page 6-5. **Figure 6-3 is superseded as follows:**

WARNING: AVOID BODILY CONTACT WITH LIQUID REFRIGERANT AND AVOID INHALING REFRIGERANT GAS. BE ESPECIALLY CAREFUL THAT REFRIGERANT DOES NOT CONTACT THE EYES. IN CASE OF REFRIGERANT LEAKS, VENTILATE THE AREA IMMEDIATELY. WEAR GOGGLES WHEN SERVICING REFRIGERANT SYSTEM.

STEP 1. REFER TO FIGURE 3-6 AND REMOVE THE FRESH AIR INLET SCREEN.
STEP 2. REMOVE CAP AND CONNECT A HOSE SECURELY TO THE SUCTION SERVICE VALVE. DISCHARGE REFRIGERANT TO AN OUTSIDE AREA.

NOTE: HOSES MUST HAVE VALVE CORE DEPRESSORS.

ME 4120-308-15 6-3 C2

Figure 6-3. Draining the refrigerant charge.

Page 6-7. Figure 6-4 (sheet 2 of 3) is superseded as follows:

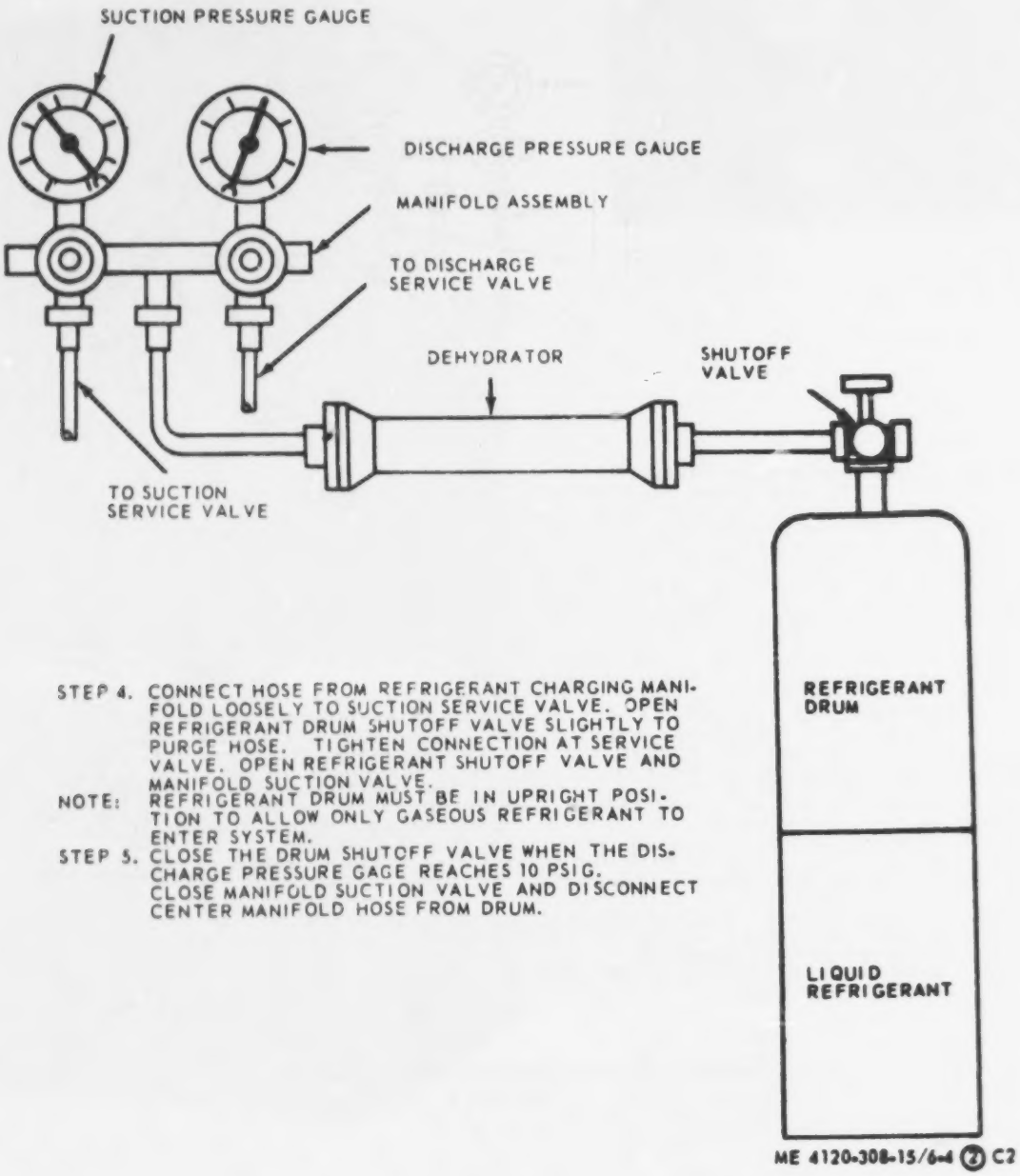
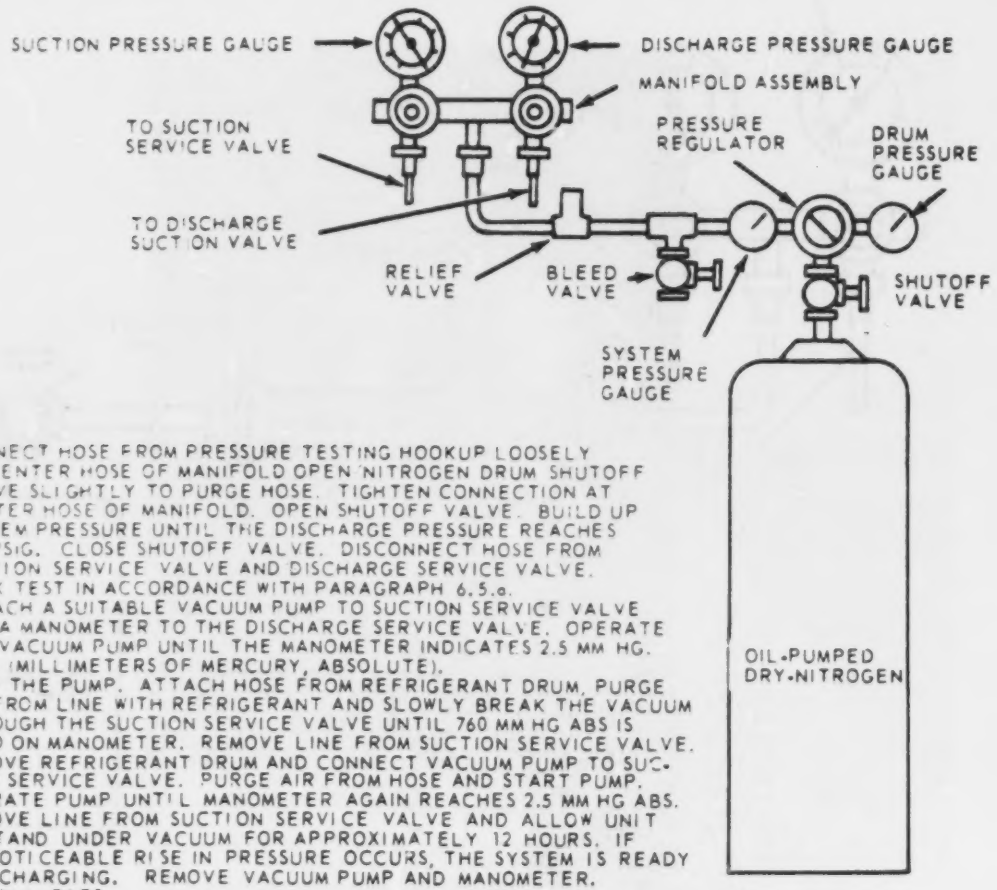

SUCTION PRESSURE GAUGE
DISCHARGE PRESSURE GAUGE
MANIFOLD ASSEMBLY
TO DISCHARGE SERVICE VALVE
DEHYDRATOR
SHUTOFF VALVE
TO SUCTION SERVICE VALVE
STEP 4. CONNECT HOSE FROM REFRIGERANT CHARGING MANIFOLD LOOSELY TO SUCTION SERVICE VALVE. OPEN REFRIGERANT DRUM SHUTOFF VALVE SLIGHTLY TO PURGE HOSE. TIGHTEN CONNECTION AT SERVICE VALVE. OPEN REFRIGERANT SHUTOFF VALVE AND MANIFOLD SUCTION VALVE.
NOTE: REFRIGERANT DRUM MUST BE IN UPRIGHT POSITION TO ALLOW ONLY GASEOUS REFRIGERANT TO ENTER SYSTEM.
STEP 5. CLOSE THE DRUM SHUTOFF VALVE WHEN THE DISCHARGE PRESSURE GAGE REACHES 10 PSIG. CLOSE MANIFOLD SUCTION VALVE AND DISCONNECT CENTER MANIFOLD HOSE FROM DRUM.
REFRIGERANT DRUM
LIQUID REFRIGERANT
ME 4120-308-15/6-4 C2

Figure 6-4. Pressure testing and evacuating the refrigerant system (sheet 2 of 3).

Page 6-7. Paragraph 6-6d is superseded as follows:

d. Operate air conditioner with rotary selector switch (fig. 2-6) set at COOL, thermostat set at maximum DECREASE, and two-speed condenser fan selector switch set at HIGH.

Page 6-8. Figure 6-4 (sheet 3 of 3) is superseded as follows:



STEP 6. CONNECT HOSE FROM PRESSURE TESTING HOOKUP LOOSELY TO CENTER HOSE OF MANIFOLD OPEN NITROGEN DRUM SHUTOFF VALVE SLIGHTLY TO PURGE HOSE. TIGHTEN CONNECTION AT CENTER HOSE OF MANIFOLD. OPEN SHUTOFF VALVE. BUILD UP SYSTEM PRESSURE UNTIL THE DISCHARGE PRESSURE REACHES 150 PSIG. CLOSE SHUTOFF VALVE. DISCONNECT HOSE FROM SUCTION SERVICE VALVE AND DISCHARGE SERVICE VALVE.

STEP 7. LEAK TEST IN ACCORDANCE WITH PARAGRAPH 6.5.a.

STEP 8. ATTACH A SUITABLE VACUUM PUMP TO SUCTION SERVICE VALVE AND A MANOMETER TO THE DISCHARGE SERVICE VALVE. OPERATE THE VACUUM PUMP UNTIL THE MANOMETER INDICATES 2.5 MM HG. ABS. (MILLIMETERS OF MERCURY, ABSOLUTE).

STEP 9. STOP THE PUMP. ATTACH HOSE FROM REFRIGERANT DRUM. PURGE AIR FROM LINE WITH REFRIGERANT AND SLOWLY BREAK THE VACUUM THROUGH THE SUCTION SERVICE VALVE UNTIL 760 MM HG ABS IS READ ON MANOMETER. REMOVE LINE FROM SUCTION SERVICE VALVE.

STEP 10. REMOVE REFRIGERANT DRUM AND CONNECT VACUUM PUMP TO SUCTION SERVICE VALVE. PURGE AIR FROM HOSE AND START PUMP. OPERATE PUMP UNTIL MANOMETER AGAIN REACHES 2.5 MM HG ABS.

STEP 11. REMOVE LINE FROM SUCTION SERVICE VALVE AND ALLOW UNIT TO STAND UNDER VACUUM FOR APPROXIMATELY 12 HOURS. IF NO NOTICEABLE RISE IN PRESSURE OCCURS, THE SYSTEM IS READY FOR CHARGING. REMOVE VACUUM PUMP AND MANOMETER. INSTALL CAPS.

NOTE: RISE IN PRESSURE WILL BE INFLUENCED BY AMBIENT TEMPERATURE. MAKE SURE VACUUM IN SYSTEM IS COMPLETELY RELIEVED BEFORE CHARGING.

NOTE: WHEN UNIT IS OPERATING DO NOT OPEN BOTH MANIFOLD VALVES AT THE SAME TIME.

ME 4120-308-15/6-4 ③ C2

Figure 6-4. Pressure testing and evacuating the refrigerant system (sheet 3 of 3).

Page 6-11. Figure 6-5 (sheet 3 of 3) is superseded as follows:

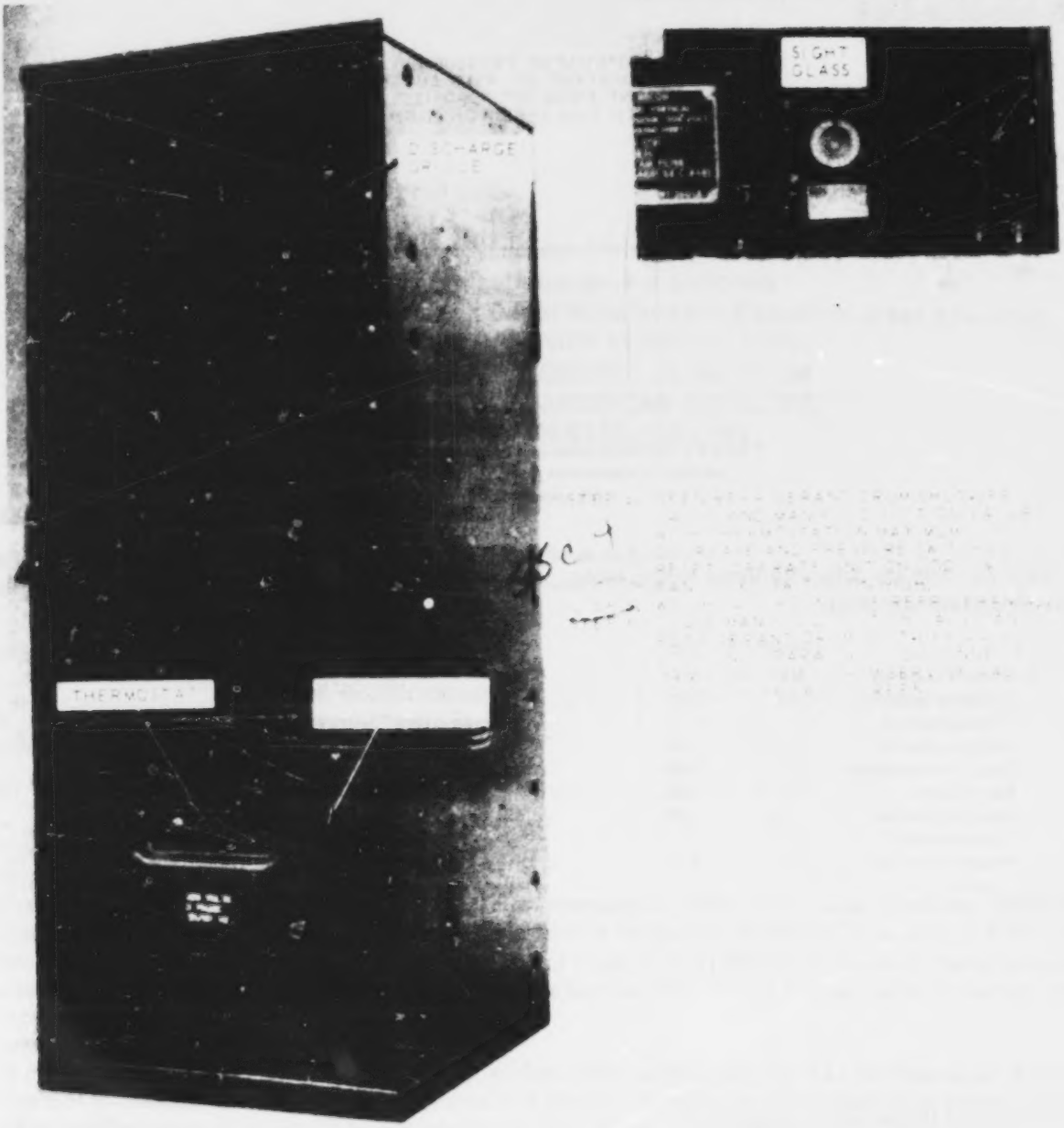


Figure 6-5. Charging the refrigerant system (sheet 3 of 3).

In paragraph 6-7*b*(1)(*f*), line 3, change "magger" to read "megger."

Page 6-12. Figure 6-6 is superseded as follows:

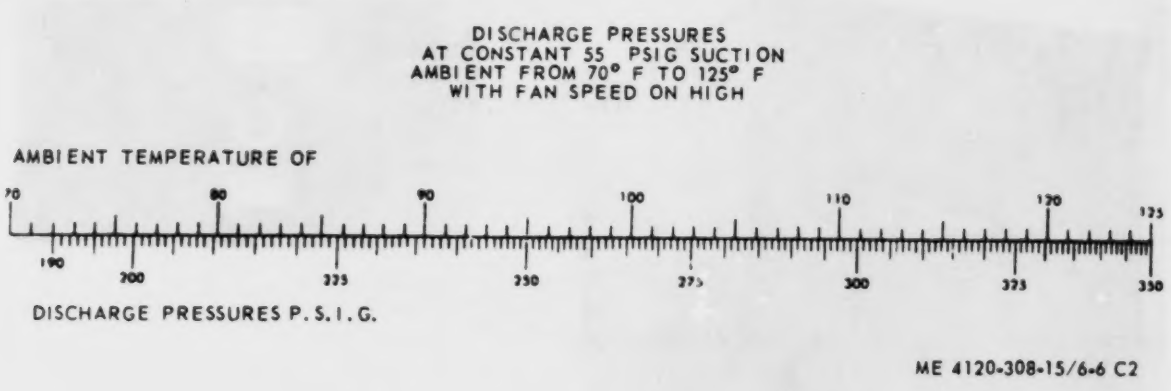


Figure 6-6. Discharge pressures at constant 55 psig suction, ambient temperatures from 70°F. to 125°F. with fan speed on high.

Page I-1. Add the following items to the Index in proper alphabetical order.

	Paragraph	Page
Blockoff assembly	2-2	2-1
Connector assembly, remote control	2-2	2-1
Damper assembly	3-25	3-10
Diode, semiconductor	3-31.1	3-20
Fuse holders	3-35.1	3-21
Motor support and cone assembly	5-26.1	5-18
Protector overload, motor	6-4	6-3
Retainer assembly filter sight glass	2-7, 5-12	2-6, 5-4
Sound alternator	2-2	2-1
Support board, electrical component	3-30	3-14

Immediately before paragraphs 3-12, 3-31*a*(2), 3-31*c*(2), 3-31*d*(2), 3-31*e*(2) and 3-34*b*, add the following paragraph:

WARNING

Be careful when working with high voltage. Failure to comply can result in serious injury or DEATH.

By the Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

VERNE L. BOWERS,
Major General, United States Army,
The Adjutant General.

Distribution:

To be distributed in accordance with DA Form 12-25, Section III (qty rqr Block No. 542), Organizational maintenance requirements for Air Conditioners, 18,000 BTU Compact.

TM 5-4120-308-15
C 3

Change
No. 8

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *21 March 1973*

Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual AIR CONDITIONER, COMPACT VERTICAL, 208V, 3 PHASE, 18,000 BTUH COOLING, 12,000 BTUH HEATING, 50/60 HERTZ, (AMERICAN AIR FILTER MODEL CH 620-2 FSN 4120-168-1781

TM 5-4120-308-15, 6 November 1969, is changed as follows:

Page 1-5, paragraph 1-4*b* (20). After *Check valve* and *(Reference only)*.

Page 1-7, paragraph 1-4*b*(32). Lines 4 and 5 are changed to read as follows:

Refrigerant Charge ..... a. 11 lbs (serial numbers CH621001 through CH621555 CH621561 through CH621968)
b. All other units contain 7 lbs.

Page 1-7. Paragraph 1-5 is superseded as follows:

1-5. Difference in models

There are significant differences in the refrigerant components. Units with serial numbers CH621001 through CH621555, and CH621561 through CH621968 have a refrigerant charge of 11 pounds of R-22. All other units have a charge rate of 7 pounds of R-22. This is a result of the deletion of the head pressure control tanks on the later serial numbered units. The check valve has also been deleted on later units. On earlier units it is not functional.

Page 2-3. Paragraph 2-3*e* is superseded as follows:

e. Installing Unit. Bolt unit to floor or other flat surface. Refer to base plan (fig. 1-3) for dimensions. Remove all accessible outside drain plugs (fig. 1-2) and install 3/8 flare by 1/2 male pipe thread half union elbows. Attach a 4-foot long drain hose, 5/16-inch ID to each connection. Tilt unit one to two degrees toward usable drains.

Page 2-6, paragraph 2-7. The following is added to paragraph *d*:

Allow unit to operate one hour before checking sight glass for moisture content and refrigerant shortage.

Page B-1. Appendix B is superseded as follows:

APPENDIX B
BASIC ISSUE ITEM LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED

Section I. INTRODUCTION

B-1. Scope

This appendix lists basic issue items, items troop installed or authorized which accompany the air conditioner, and are required by the crew/operator for operation, installation, or operator's maintenance.

B-2. General

This basic issue items, items troop installed or authorized list is divided into the following sections:

a. Basic Issue Items List—Section II. Not applicable.

b. Items Troop Installed or Authorized List—Section III. A list in alphabetical sequence of items which, at the discretion of the unit commander, may accompany the end item, but are NOT subject to be turned in with the end item.

B-3. Explanation of Columns

The following provides an explanation of columns in the tabular list of Basic Issue Items List, Section II, and Items Troop Installed or Authorized, Section III.

a. Source, Maintenance, and Recoverability Code(s) (SMR). Not applicable.

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the Federal item name and any additional description of the item required.

d. Unit of Measure (U/M). A 2-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based, e.g., ft, ea, pr, etc.

e. Quantity Authorized (Items Troop Installed or Authorized Only). This column indicates the quantity of the item authorized to be used with the equipment.

SECTION III. ITEMS TROOP INSTALLED OR AUTHORIZED LIST

(1) SMR code	(2) Federal stock number	(3) Description Ref no. & mfr code Usable on code	(4) Unit of meas	(5) Qty auth
	7520-559-9618	CASE, MANUAL	EA	1
		#SOUND ATTENUATOR 13211E3798 (97403)	EA	1
		NOTE #Listed for identification purpose only. TM 5-4120-308-25P is the authorization document for this item, and is to be cited as the basis for any acquisitioning.		

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-25C (qty rqr block No. 542) organizational maintenance requirements for Air Conditioners, 18,000 BTU, Compact.

TM 5-4120-308-15
C 4

Change
No. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *3 October 1973*

Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual AIR CONDITIONER, COMPACT VERTICAL, 208V, 3 PHASE, 18,000 BTUH COOLING: 12,000 BTUH HEATING, 50/60 HERTZ, AMERICAN AIR FILTER MODEL CH 620-2, FSN 4120-168-1781

TM 5-4120-308-15, 6 November 1969, is changed as follows:

Page 1-1. Paragraph 1-2*b* is superseded as follows:

b. The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commander, U. S. Army Troop Support Command, ATTN: AMSTS-MPP, 4300 Goodfellow Boulevard, St. Louis, MO 63120.

Page 1-1. In paragraph 1-3*a*, the following is added after the last sentence:

On serial numbers CH-621561 and subsequent, a waterproof rain cover (figures 1-2.1 and 1-2.2) is provided to protect the unit when not in use.

Page 1-2. Under figure 1-1, the legend line is changed to read as follows:

Figure 1-1. Air conditioner, right front, three-quarter view, with shipping dimensions (prior to serial number CH-621561)

Figure 1-1.1 is added, as follows:

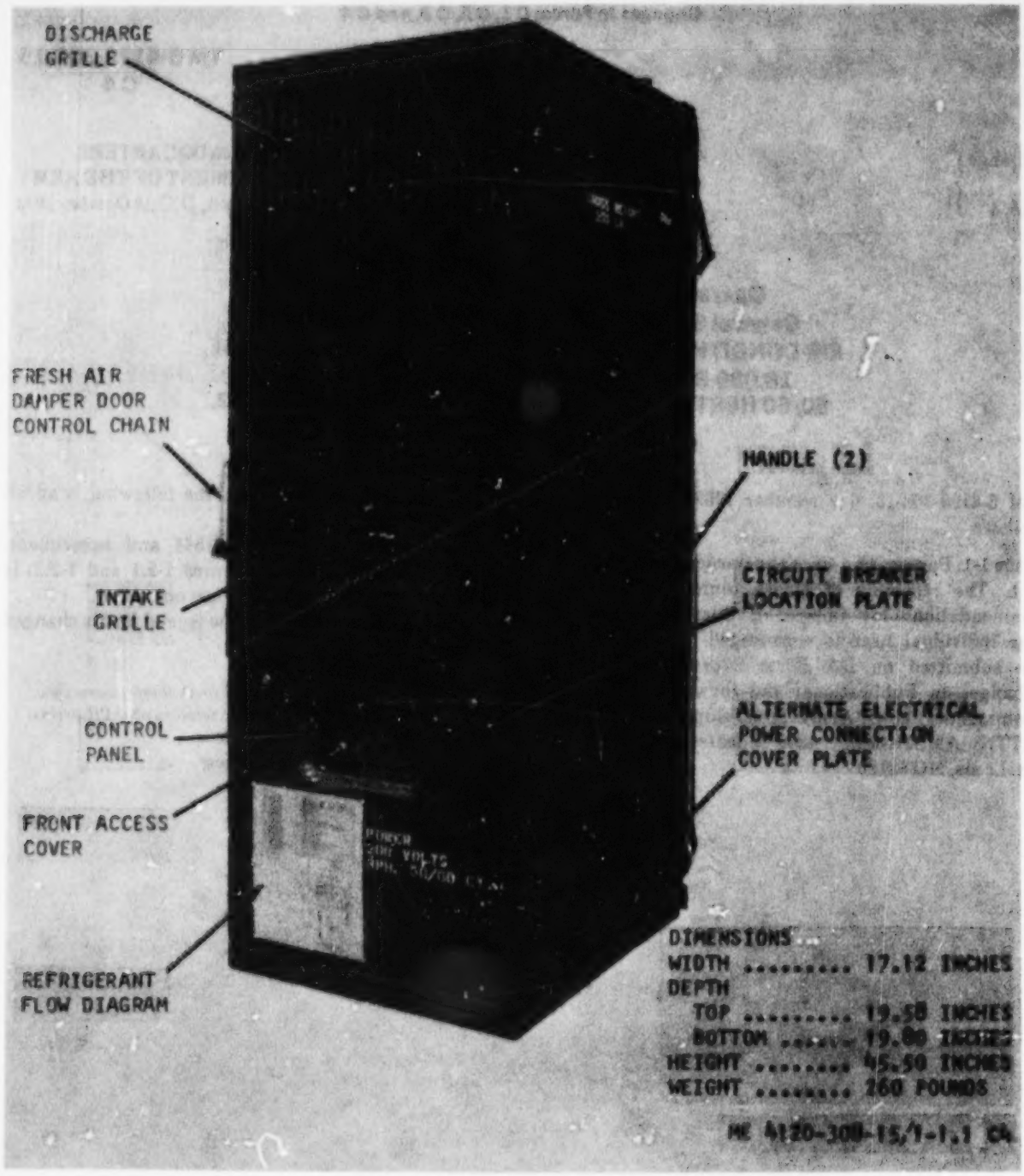


Figure 1-1.1. Air conditioner, left front three-quarter view, with shipping dimensions (serial numbers CH-621561 and subsequent).

Page 1-3. **Under figure 1-2, the legend line is changed to read as follows:**

Figure 1-2. Air conditioner, right rear three-quarter view (prior to serial number CH-621561).

Figures 1-2.1 and 1-2.2 are added as follows:

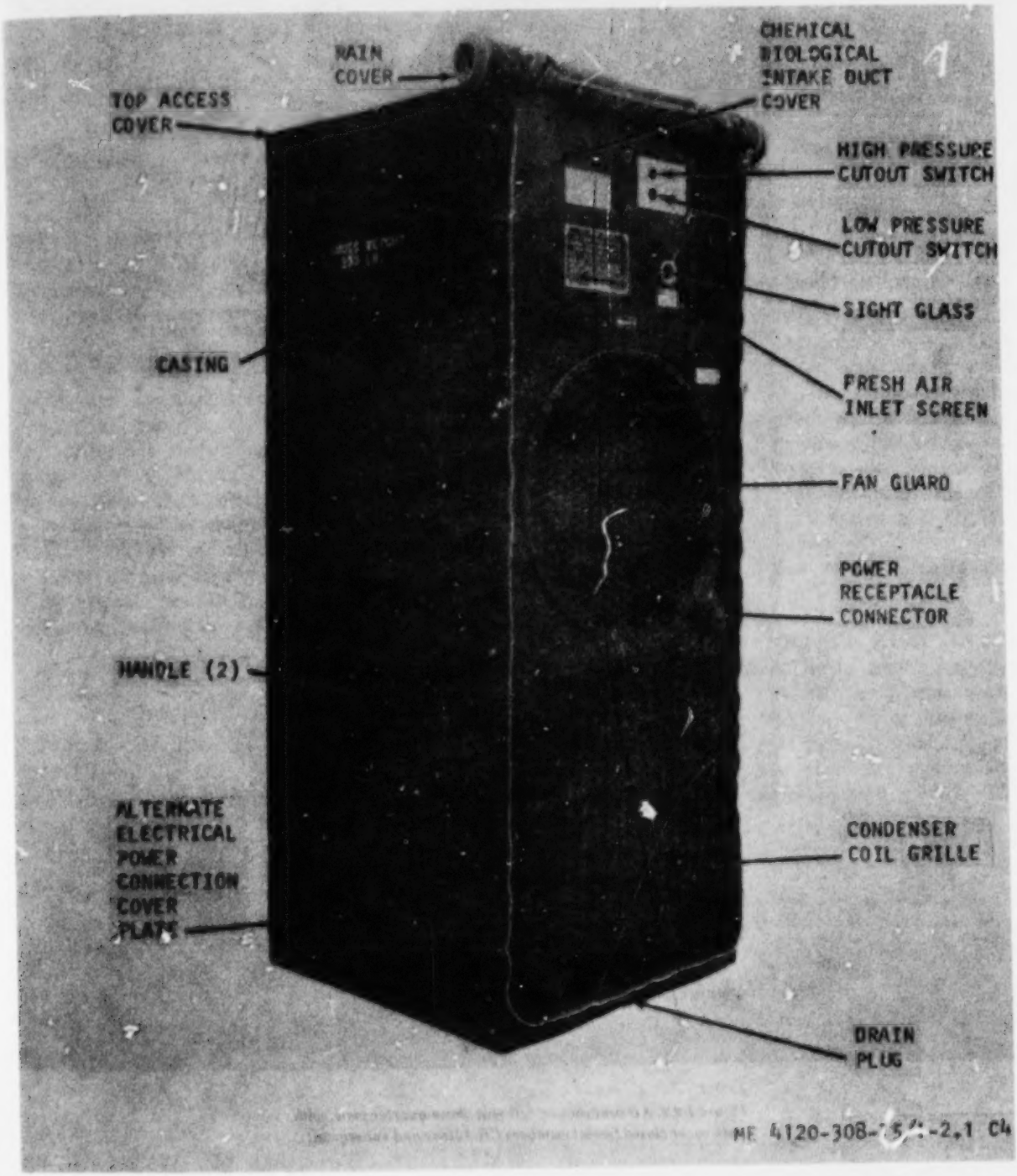


Figure 1-2.1. Air conditioner, left rear three-quarter view, with rain cover open (serial numbers CH-621561 and subsequent).

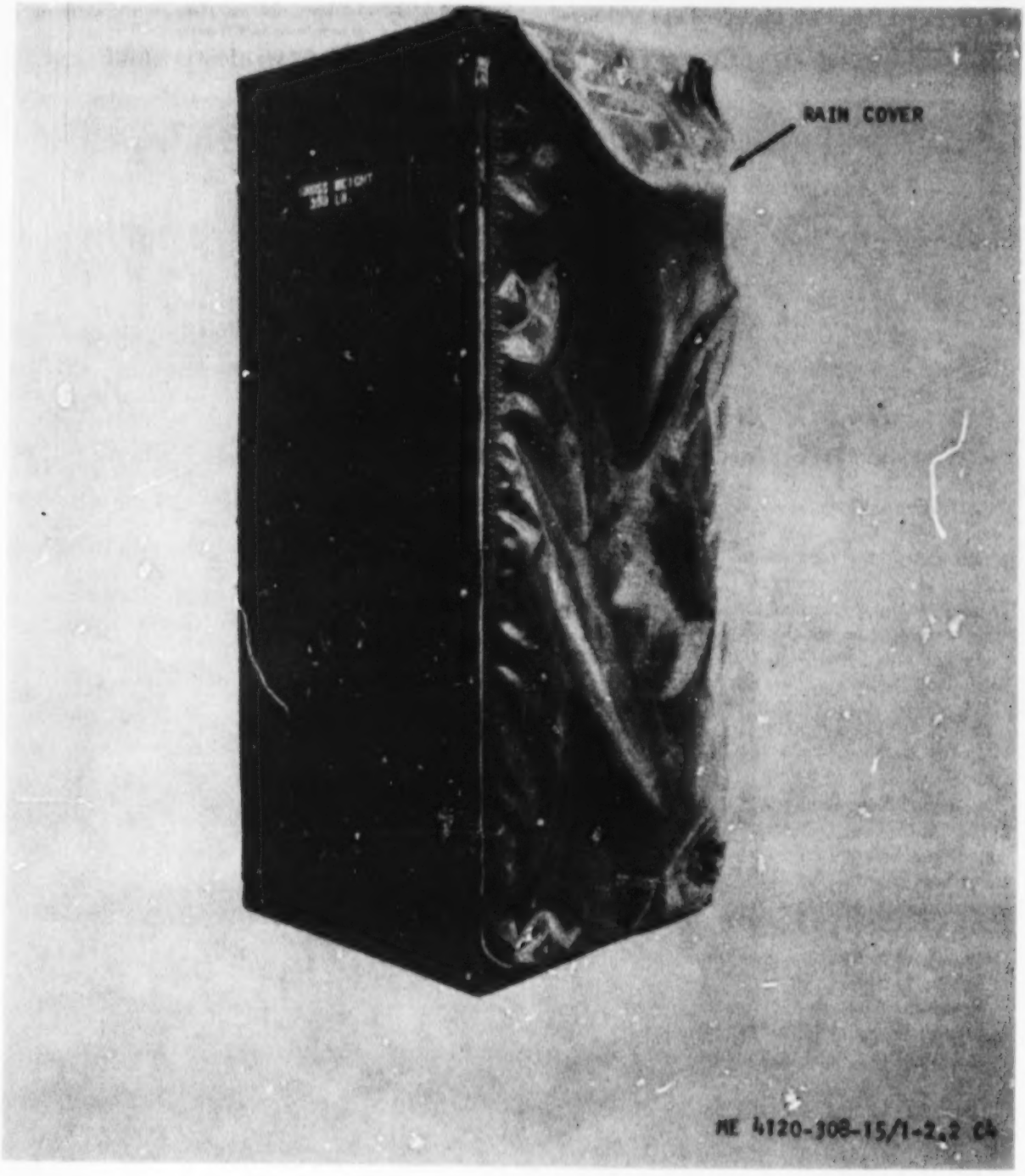


Figure 1-2.2. Air conditioner, left rear three-quarter view, with rain cover closed (serial numbers CH-621561 and subsequent).

Page 1-5. In paragraph 1-4*b*(20), the heading is changed to read as follows:

(20) *Check valve (prior to serial number CH-621969; not used in subsequent units).*

In paragraph 1-4*b*(24), line 2 is changed to read as follows:

Part number ..... TCLE100HW100-6A (prior to serial number CH-621561)
TCLEB100HW100-6A (serial numbers CH-621561 through CH-621968).
TCL100HW100-15B (serial numbers CH-621969 and subsequent).

Page 1-7. In paragraph 1-4*b*(32), line 4, "Refrigerant charge . . . 11 lbs" is changed to read: Refrigerant charge . . . See paragraph 1-5.

Paragraph 1-5 is superseded as follows:

1-5. Difference in Models

There are significant differences between units covered in this manual. These differences are in the refrigerant components. Units with serial numbers CH-621001 through CH-621968 have a refrigerant charge of 11 pounds of R-22. All other units have a refrigerant charge of 7.5 pounds of R-22. This is because of deletion of the accumulator tanks on the later serial numbered units. The check valve has also been deleted on later units. On earlier units, the check valve is not functional.

Page 2-3. Paragraph 2-3*h* and a caution note are added after the note following paragraph 2-3*g*(4) as follows:

h. Rain Cover Removal. Units with serial numbers CH-621561 and subsequent incorporate a rain cover. Refer to figure 1-2.1 and open the rain cover and secure it to the top of the unit prior to operation.

Caution

Damage to the unit may result if the operation is attempted with the rain cover closed.

Page 2-6. Paragraph 2-4*a*(4) is added after 2-4*a*(3) as follows:

(4) On units with serial numbers CH-621561 and subsequent, refer to figure 1-2.2 and close the rain cover before moving or crating the unit.

Page 2-10. The following note is added after paragraph 2-16:

NOTE

Units with serial numbers CH-621561 and subsequent incorporate RFI gaskets on access panels. Unpainted metal surfaces in contact with RFI gaskets must be kept clean and left unpainted to insure proper suppression of radio-frequency interfence.

Page 3-6. Paragraph 3-16 is superseded as follows:

3-16. General Methods Used To Attain Proper Suppression

Essentially, radio-frequency interference is suppressed by providing a low resistance path to ground for stray currents. The methods used include shielding the high-frequency wires, grounding the frame with bonding straps, and using capacitors and resistors to suppress interference generated by individual components. Units with serial numbers CH-621561 and subsequent also incorporate RFI gasketing on access panels.

Paragraph 3-19.1 is added after 3-19 as follows:

3-19.1 RFI Gaskets

On units with serial numbers CH-621561 and subsequent, examine RFI gaskets to insure that they are in good condition and are firmly cemented in place. Examine the mating surfaces to insure that they are clean and free of paint. If necessary, replace RFI gaskets and/or clean the mating surfaces to provide good electrical contact.

Page 3-8. Under figure 3-4, the legend line is changed to read as follows:

Figure 3-4. Discharge grille, intake grille, and front and top access covers, removal and installation (prior to serial number CH-621561).

Figure 3-4.1 is added as follows:

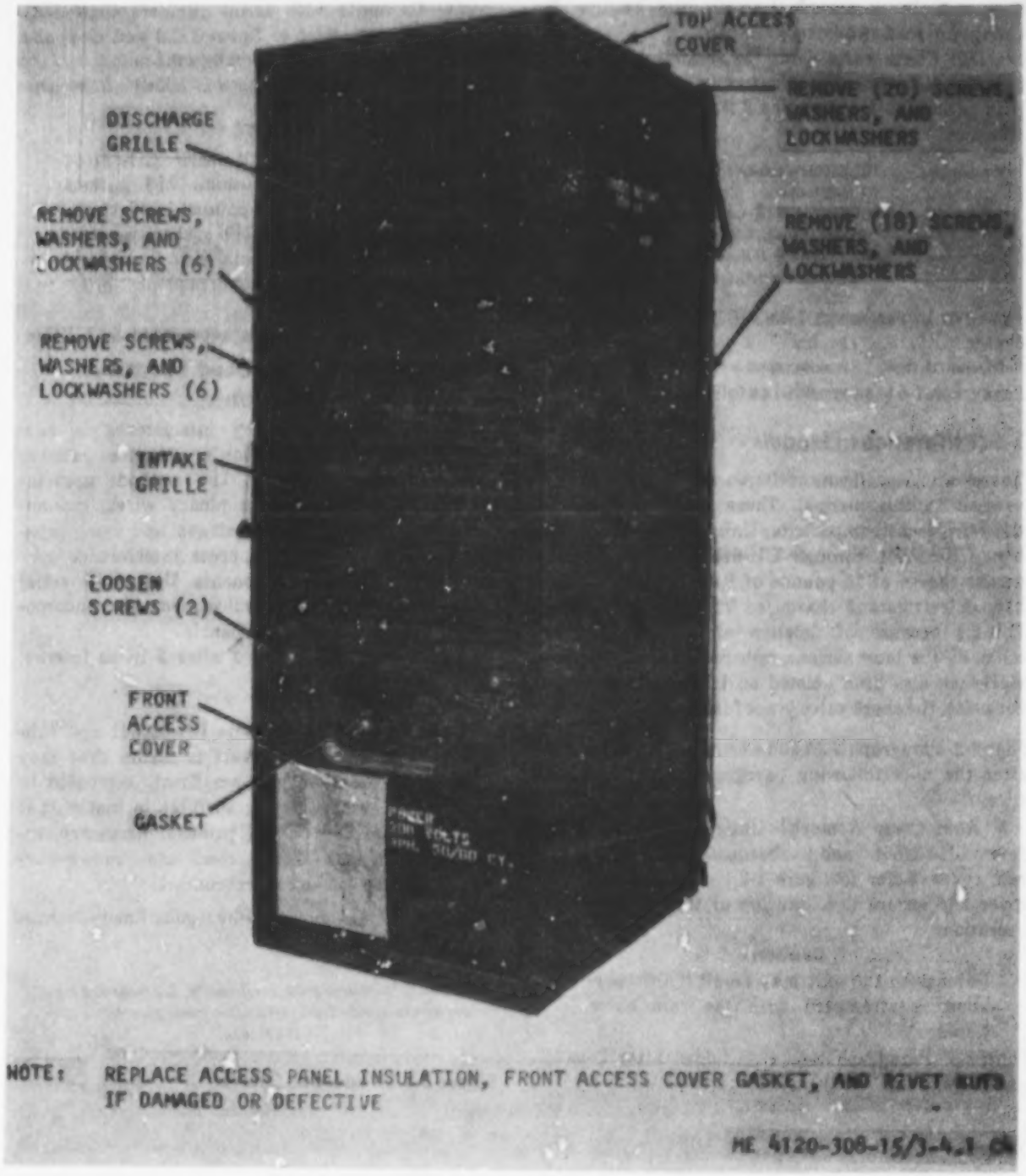

TOP ACCESS COVER
REMOVE (20) SCREWS, WASHERS, AND LOCKWASHERS
DISCHARGE GRILLE
REMOVE SCREWS, WASHERS, AND LOCKWASHERS (6)
REMOVE (18) SCREWS, WASHERS, AND LOCKWASHERS
REMOVE SCREWS, WASHERS, AND LOCKWASHERS (6)
INTAKE GRILLE
LOOSEN SCREWS (2)
FRONT ACCESS COVER
GASKET
NOTE: REPLACE ACCESS PANEL INSULATION, FRONT ACCESS COVER GASKET, AND RIVET NUTS IF DAMAGED OR DEFECTIVE
ME 4120-308-15/3-4.1

Figure 3-4.1. Discharge grille, intake grille, and front and top access covers, removal and installation (serial numbers CH-621561 and subsequent).

Paragraph 3-20*b*.1 is added after 3-20*b* as follows:

b.1. On units serial numbers CH-621561 and subsequent, refer to figure 3-4.1 and remove the rain cover to enable the removal of the top access cover.

Paragraph 3-20*c*.1. is added after 3-20*c* as follows:

c.1. On units serial numbers CH-621561 and subsequent, install the rain cover after the top access cover has been installed.

Page 3-10. In paragraph 3-22, the title is superseded as follows:

3-22. Fresh Air Inlet Screen, CB Intake Duct Cover, Fan Guard, Condenser Coil Grille and Screen, and Rain Cover.

Paragraph 3-22*a.1* is added after 3-22*a* as follows:

a.1. On units with serial numbers CH-621561 and subsequent, a waterproof rain cover (fig. 2-6.1) is provided to protect the unit when it is not in use.

Paragraph 3-22*b.1* is added after 3-22*b* as follows:

b.1. On units serial numbers CH-621561 and subsequent, refer to figure 3-6.1 and remove the rain cover.

Paragraph 3-22*c.1* is added after 3-22*c* as follows:

c.1. On units serial numbers CH-621561 and subsequent, refer to figure 3-6.1 and install the rain cover.

Paragraph 3-25*a.1* is added after 3-25*a* as follows:

a.1. On units with serial numbers CH-621561 and subsequent, a spring (fig. 3-9.1) is provided to maintain tension on the chain when the damper door is closed.

Paragraph 3-25b is superseded as follows:

b. Inspect. Inspect for a broken chain or spring and damaged hinge, and repair as necessary.

Paragraph 3-25*c*(3) is added after 3-25*c*(2) as follows:

(3) Refer to figure 3-9.1 and replace the spring.

Page 3-11. Under figure 3-6, the legend line is changed to read as follows:

Figure 3-6. Fresh air inlet screen, intake cover, fan guard, and condenser coil grille and screen, removal and installation (prior to serial number CH-621561).

Figure 3-6.1 is added as follows:

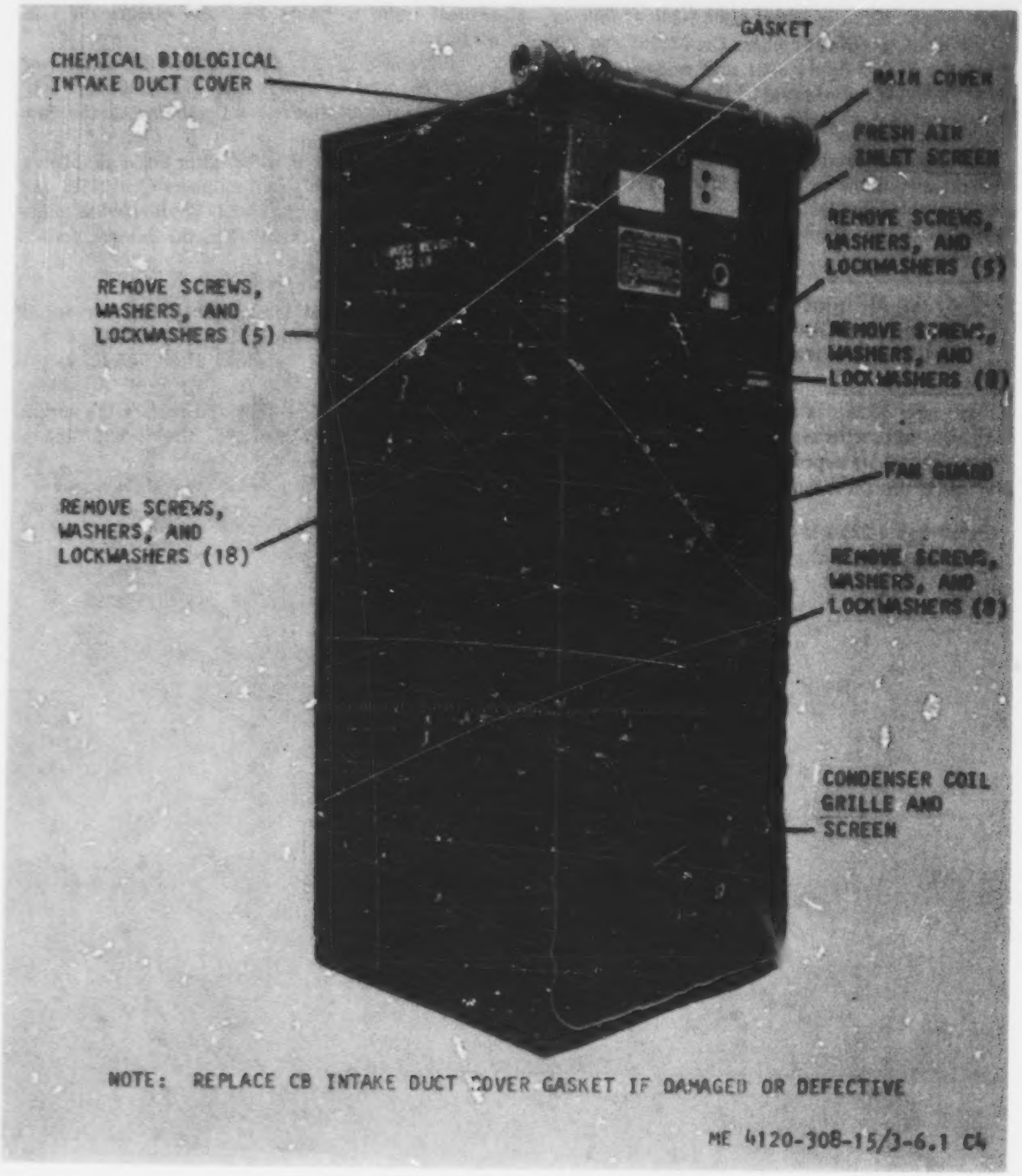

GASKET
CHEMICAL BIOLOGICAL INTAKE DUCT COVER
RAIN COVER
FRESH AIR INLET SCREEN
REMOVE SCREWS, WASHERS, AND LOCKWASHERS (5)
REMOVE SCREWS, WASHERS, AND LOCKWASHERS (5)
REMOVE SCREWS, WASHERS, AND LOCKWASHERS (8)
FAN GUARD
REMOVE SCREWS, WASHERS, AND LOCKWASHERS (18)
REMOVE SCREWS, WASHERS, AND LOCKWASHERS (8)
CONDENSER COIL GRILLE AND SCREEN
NOTE: REPLACE CB INTAKE DUCT COVER GASKET IF DAMAGED OR DEFECTIVE
ME 4120-308-15/3-6.1 C4

Figure 3-6.1. Fresh air inlet screen, intake cover, fan guard, condenser coil grille and screen, and rain cover, removal and installation (serial numbers CH-621561 and subsequent).

Page 3-14. Under figure 3-9, the legend line is changed to read as follows:

Figure 3-9. Fresh air damper door control chain (prior to serial number CH-621561).

Figure 3-9.1 is added as follows:

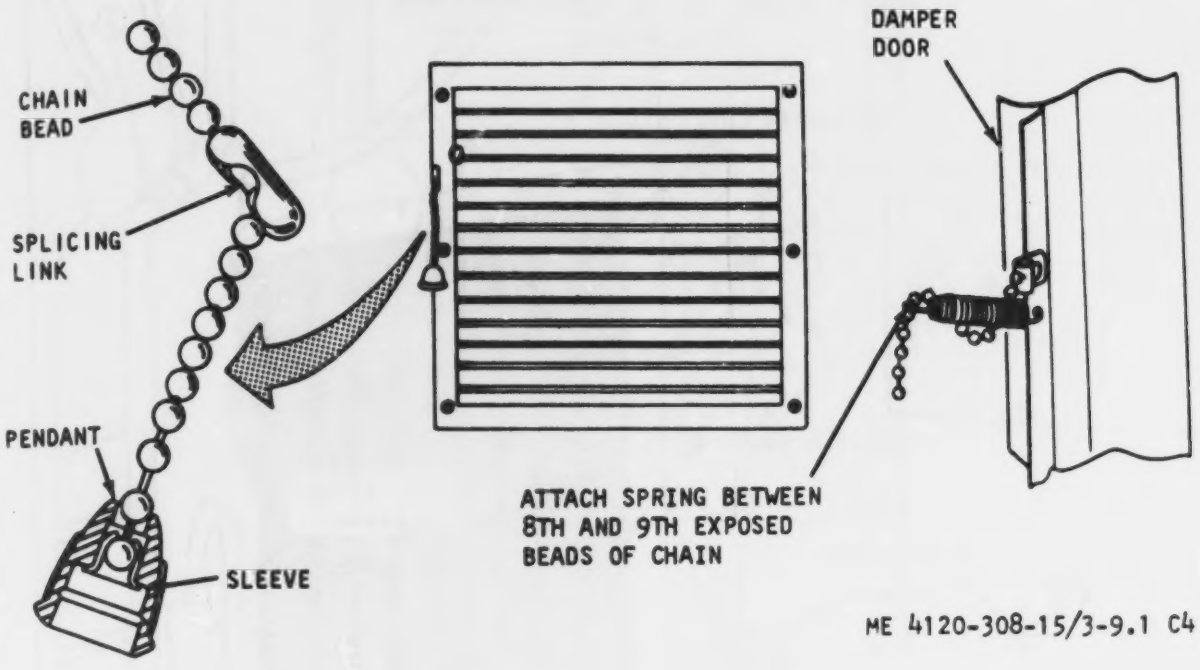


Figure 3-9.1. Fresh air damper door control chain and spring (serial numbers CH-621561 and subsequent).

Page 5-4. Paragraph 5-10a(6) is superseded as follows:

(6) Refer to figure 5-2 (prior to serial number CH-621561) or figure 5-2.1 (serial numbers CH-621561 and subsequent), and remove the condenser coil.

Page 5-6. Under figure 5-2, the legend line is changed to read as follows:

Figure 5-2. Condenser coil, removal and installation (prior to serial number CH-621561).

Figure 5-2.1 is added as follows:

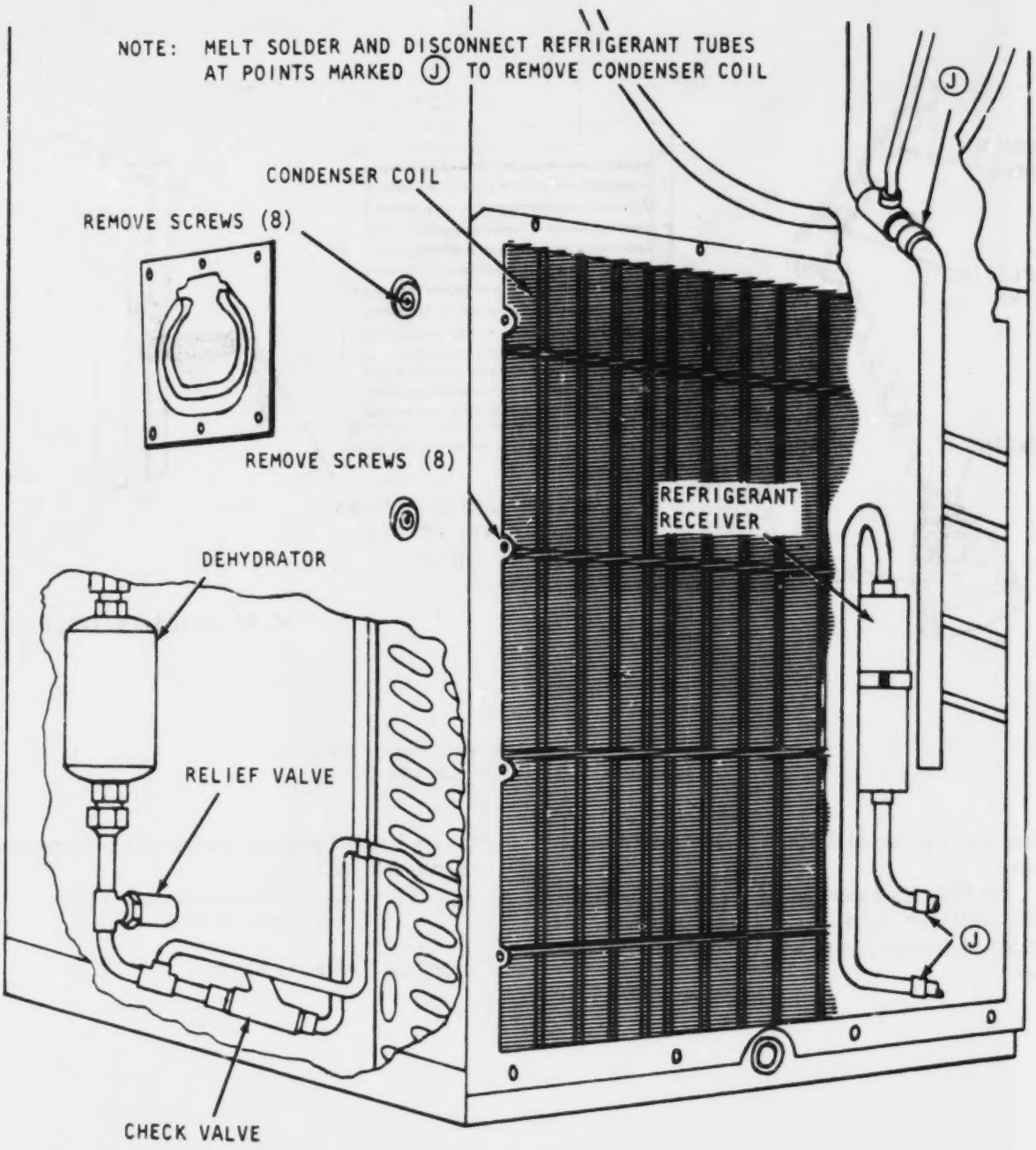

NOTE: MELT SOLDER AND DISCONNECT REFRIGERANT TUBES AT POINTS MARKED (J) TO REMOVE CONDENSER COIL
CONDENSER COIL
REMOVE SCREWS (8)
REMOVE SCREWS (8)
REFRIGERANT RECEIVER
DEHYDRATOR
RELIEF VALVE
CHECK VALVE
(NOTE: CHECK VALVE NOT USED ON UNITS SERIAL NUMBERS CH-621969 AND SUBSEQUENT)
ME 4120-308-15/5-21C4

Figure 5-2.1. Condenser coil, removal and installation (serial numbers CH-621561 and subsequent)

Page 5-15. Under figure 5-11, the legend line is changed to read as follows:

Figure 5-11. High- and low-pressure cutout switch (prior to serial number CH-621561).

Figure 5-11.1 is added as follows:

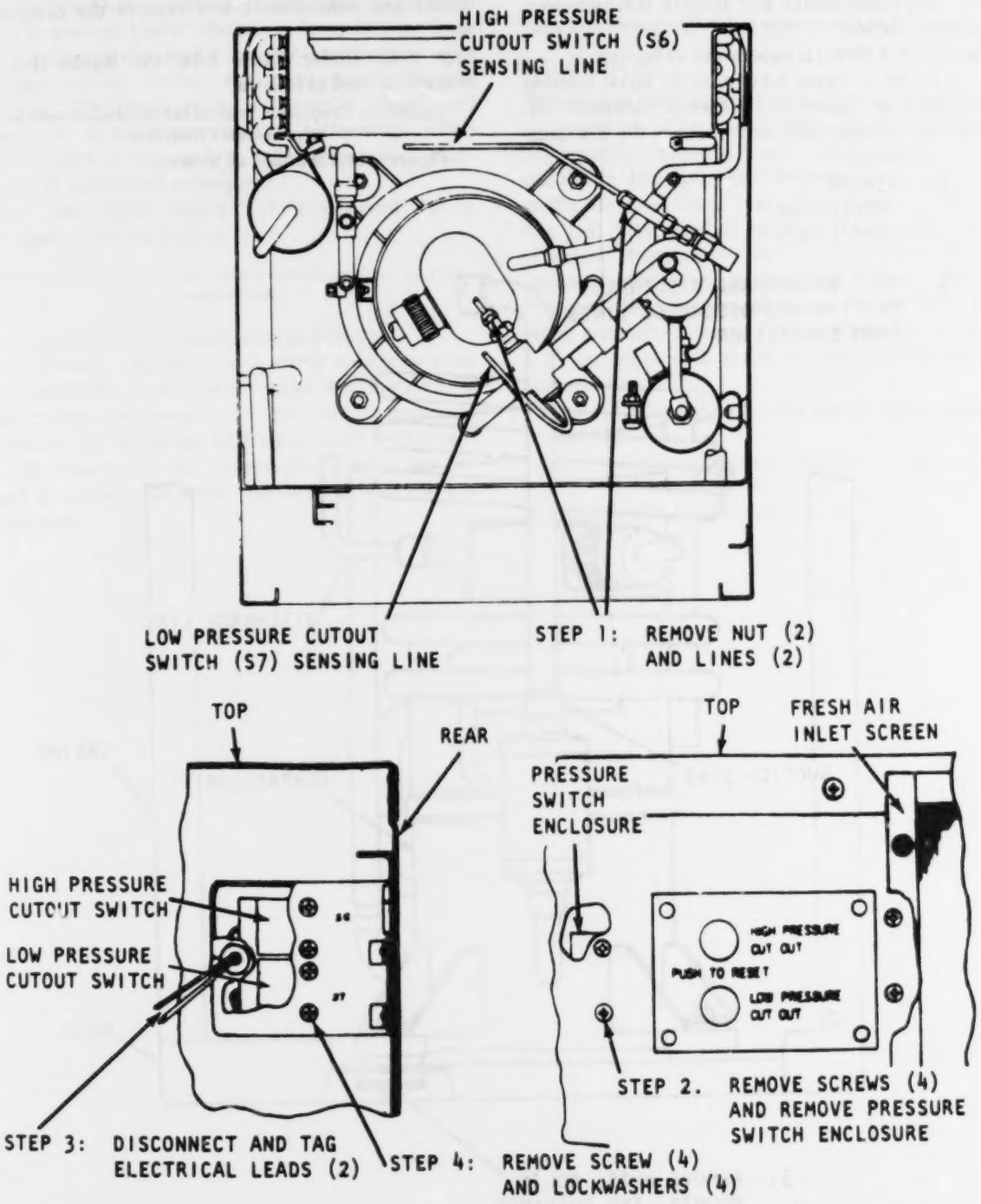

HIGH PRESSURE CUTOUT SWITCH (S6) SENSING LINE
LOW PRESSURE CUTOUT SWITCH (S7) SENSING LINE
STEP 1: REMOVE NUT (2) AND LINES (2)
TOP
REAR
HIGH PRESSURE CUTOUT SWITCH
LOW PRESSURE CUTOUT SWITCH
S6
S7
STEP 3: DISCONNECT AND TAG ELECTRICAL LEADS (2)
STEP 4: REMOVE SCREW (4) AND LOCKWASHERS (4)
TOP
FRESH AIR INLET SCREEN
PRESSURE SWITCH ENCLOSURE
HIGH PRESSURE CUT OUT
PUSH TO RESET
LOW PRESSURE CUT OUT
STEP 2. REMOVE SCREWS (4) AND REMOVE PRESSURE SWITCH ENCLOSURE
ME 4120-308-15/5-11.1 C4

Figure 5-11.1. High- and low-pressure cutout switch (serial numbers CH-621561 and subsequent).

Page 5-16. Paragraph 5-19*b*(5) is superseded as follows:

(5) Refer to figure 5-11 (prior to serial number CH-621561) or figure 5-11.1 (serial numbers CH-621561 and subsequent), and remove the high-pressure cutout switch.

Paragraph 5-20*b*(5) is superseded as follows:

(5) Refer to figure 5-11 (prior to serial number CH-621561) or figure 5-11.1 (serial numbers CH-621561 and subsequent), and remove the low-pressure cutout switch.

Page 5-17. Paragraph 5-23*a*(4) is superseded as follows:

(4) Refer to figure 5-14 (prior to serial number CH-621561) or figure 5-14.1 (serial numbers CH-621451 and subsequent), and remove the compressor.

Page 5-18. Under figure 5-14, the legend line is changed to read as follows:

Figure 5-14. Compressor, removal and installation (prior to serial number CH-621561).

Figure 5-14.1 is added as follows:

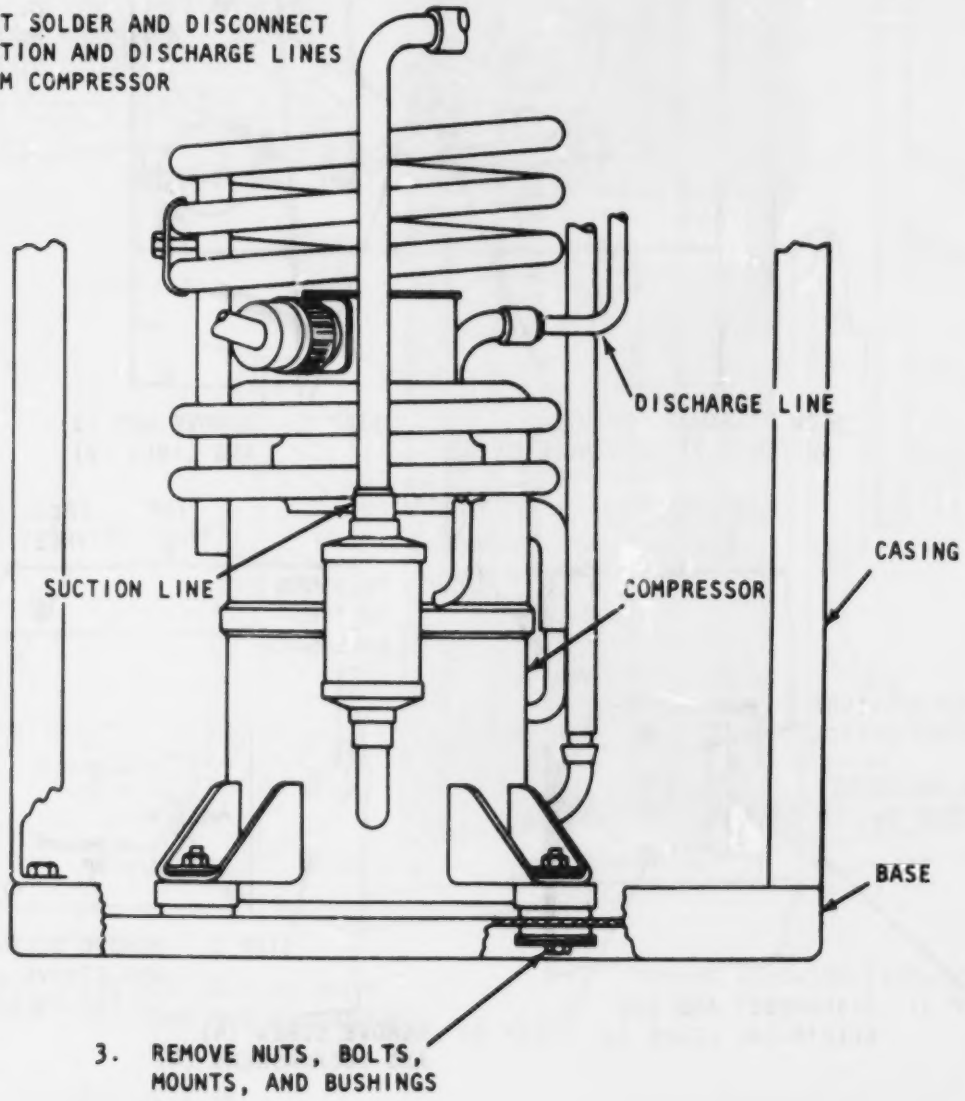


Figure 5-14.1 Compressor, removal and installation (serial numbers CH-621561 and subsequent).

Page 5-18. Paragraph 5-28*a* is superseded as follows:

a. General. On units with serial numbers prior to CH-621969, a check valve is installed in the system to prevent liquid refrigerant from flowing from the accumulator tanks to the compressor discharge valves during the compressor off-cycle periods. The check valve is normally closed, and opens at a 0.5 psig pressure differential. (This check valve is not used in units with serial numbers CH-621969 and subsequent.)

Page 5-22. Under figure 5-17, the legend line is changed to read as follows:

Figure 5-17. Check valve, removal and installation (prior to serial number 621969).

Paragraph 5-29*a* is superseded as follows:

a. General. On units with serial numbers prior to CH-621969, accumulator tanks are installed in the system to permit low ambient temperature operation by supplying additional liquid refrigerant to the evaporator coil. (Accumulator tanks are not used in units with serial numbers CH-621969 and subsequent.)

Page 5-23. Under figure 5-18, the legend line is changed to read as follows:

Figure 5-18. Accumulator tanks, removal and installation (prior to serial number CH-621969).

Page 6-1. Paragraph 6-1 is superseded as follows:

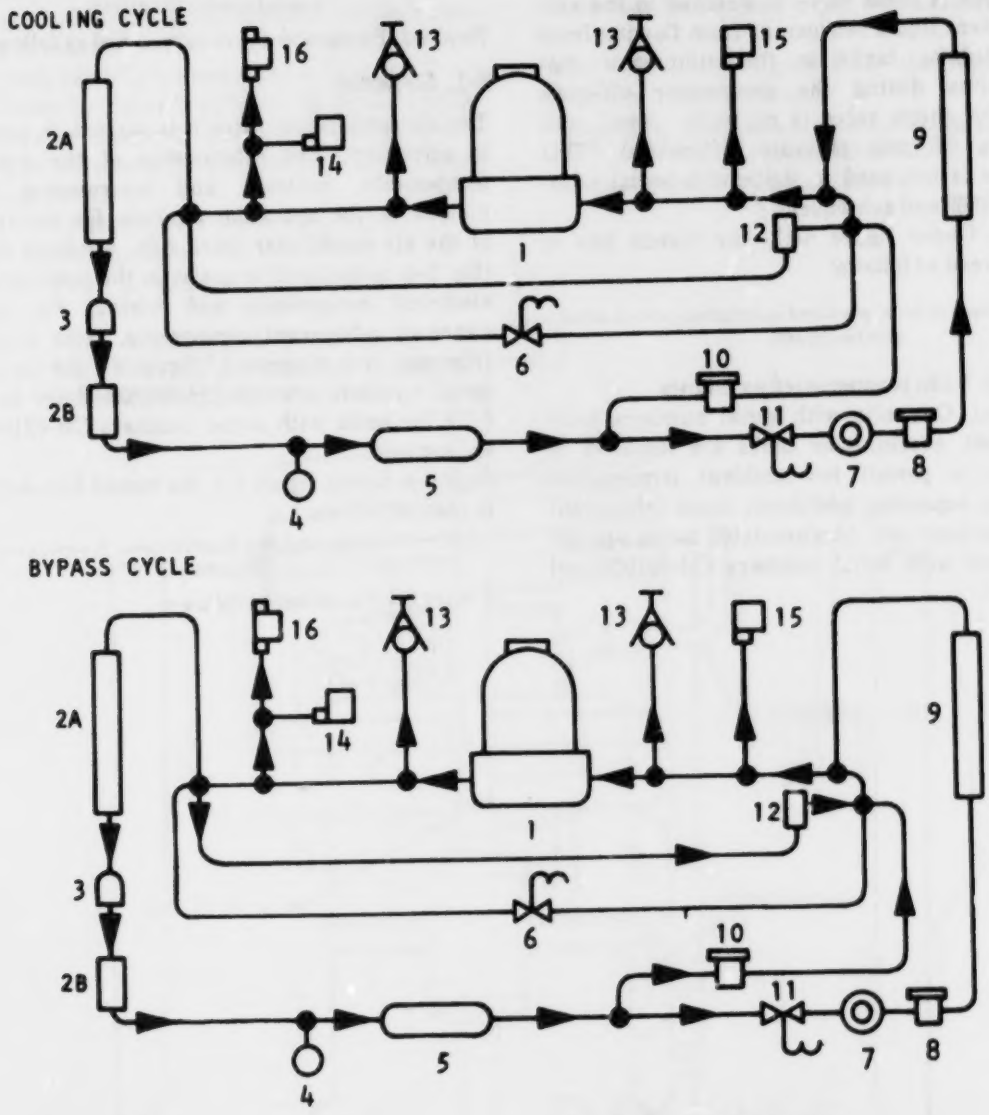
6-1. General

The air conditioner, after it is started, is automatic in operation. The relationship of the automatic components, controls, and instruments is explained in the operation analysis for maintenance of the air conditioner (para 6-2). A wiring diagram (fig. 1-4) is included to assist in the maintenance of electrical components and wiring. For maintenance of refrigerant components, refer to the refrigerant flow diagram of figure 6-1 for units with serial numbers prior to CH-621969. Refer to figure 6-1.1 for units with serial numbers CH-621969 and subsequent.

Page 6-2. Under figure 6-1, the legend line is changed to read as follows:

Figure 6-1. Refrigerant flow diagram (prior to serial number CH-621969).

Figure 6-1.1 is added as follows:



1 COMPRESSOR
2A COIL, CONDENSER
2B SUBCOOLER
3 RECEIVER
4 VALVE, PRESSURE RELIEF
5 DEHYDRATOR, DESICCANT
6 VALVE, SOLENOID, PRESSURE EQUALIZER
7 GLASS, SIGHT
8 VALVE, EXPANSION, EVAPORATOR
9 COIL, EVAPORATOR
10 VALVE, EXPANSION, COMPRESSOR BYPASS
11 VALVE, SOLENOID, COMPRESSOR BYPASS
12 REGULATOR, FLUID PRESSURE
13 VALVE, SERVICE WITH CAP
14 SWITCH, PRESSURE, FAN SPEED
15 SWITCH, LOW PRESSURE CUTOUT
16 SWITCH, HIGH PRESSURE CUTOUT

ME 4120-308-15/6-1.1 C4

Figure 6-1.1. Refrigerant flow diagram (serial numbers CH-621969 and subsequent).

Page 6-11. **In figure 6-5 (sheet 3 of 3), Step 5 is superseded as follows:**

STEP 5. ON UNITS WITH SERIAL NUMBERS PRIOR TO CH-621969, WEIGH IN 11 POUNDS OF REFRIGERANT-22. ON UNITS WITH SERIAL NUMBERS CH-621969 AND SUBSEQUENT, WEIGH IN 7.5 POUNDS OF REFRIGERANT-22.

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:
VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-25C (qty rqr block No. 542) Organizational Maintenance Requirements for Air Conditioners, 18,000 BTU, Compact.

Changes in force: C 1, C 2, C 3, C 4, C 5 and C 6

TM 5-4120-308-15
C 6

CHANGE
NO. 6

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *13 March 1975*

Operator, Organizational, Direct Support, General Support and Depot Maintenance Manual

AIR CONDITIONER, COMPACT, VERTICAL, 208 VOLT, 3 PHASE, 50/60 HERTZ, 18,000 BTU COOLING, 12,000 BTU HEATING, AMERICAN AIR FILTER MODEL CH620-2, NSN 4120-00-168-1781

TM 5-4120-308-15, 6 November 1969, is changed as follows:

Title is changed as shown above.

Page 2 of cover. Add the following warning to the list of safety precautions:

WARNING

The burning of polyurethane foams is dangerous. Due to the chemical composition of a polyurethane foam, toxic fumes are released when it is burned or heated. If it is burned or heated indoors, such as during a welding operation in its proximity, precautions should be taken to adequately ventilate the area. An exhaust system equivalent to that of a paint spray booth should be used. Air supplied respirators, approved by the National Institute for Occupational Safety & Health or the U.S. Bureau of Mines, should be used for all welding in confined spaces and when ventilation is inadequate. Individuals who have chronic or recurrent respiratory conditions, including allergies and asthma, should not be employed in this type of environment.

By Order of the Secretary of the Army:

FRED C. WEYAND
General, United States Army
Chief of Staff

Official:

VERNE L. BOWERS
Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-25C, (qty rqr block No. 541). Operator maintenance requirements for environmental equipment: air conditioners, 18,000 BTU, compact.

TM 5-4120-308-15
C 7

CHANGE
NO. 7

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *21 May 1976*

Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual
AIR CONDITIONER, COMPACT VERTICAL: 208 VOLT, 3 PHASE, 50/60 HERTZ, 18,000 BTU COOLING, 12,000 BTU HEATING
AMERICAN AIR FILTER MODEL CH620-2
(KECO INDUSTRIES, INC. MODEL F18T-2) NSN 4120-00-168-1781

TM 5-4120-308-15, 6 November 1969 is changed as follows.

KECO Industries Model F18T-2, Serial Nos. 75036 through 75150 from their preceding Models of 18,000 BTU Air Conditioners apply only.

The title is changed as shown above.
Add the following immediately below the title.

REPORTING OF ERRORS

You can help improve this manual by calling attention to errors and by recommending improvements. Your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), and DA Form 2028-2 (Recommended Changes to Equipment Technical Manuals) may be used. Copies of DA Form 2028-2 are attached in the back of this change for your use. Please mail your recommended changes direct to Commander: US Army Troop Support Command, ATTN: AMSTS-MPP, 4300 Goodfellow Boulevard, St. Louis, MO 63120. A reply will be furnished direct to you.

Page 1-1, paragraph 1-1*a*, line 2. "Model CH620-2 Air Conditioner" is changed to read, "Model CH 620-2 and F18T-2 Air Conditioners."

Paragraph 1-2*b* is rescinded.

Paragraph 1-3*a*, line 1 and 2. "The air conditioner, fig. 1-1 and 1-2) is used", is changed to read, "The air conditioners, figures 1-1, 1-1.1, and 1-2 are used"

Line 7. "It is a" is changed to read, "They are".

Line 9. "It is" is changed to read, "They are".

Paragraph *a*(12) is superseded as follows.

(12) Circuit breaker instruction plate, located on rear access cover, provides instruction for circuit breaker reset. See figure 1-2.1.

Paragraph *b*. Subparagraph (1.1) is added as follows.

(1.1) *U.S. Army identification plate.*

US Army Mobility Equipment Command
Air Conditioner: vertical
Compact, 18,000 BTU/HR
208 Volt, three phase, 50/60 hertz
Keco Model F18T-2
NSN 4120-00-959-4453
Part No. 94703-13215E9850
Mfg by Keco Industries, Inc.
Contract No. DSA 400-75-C-3739
Date: (as applicable)
Serial No. (75036 through 75150) Wt: 250 lbs.

Paragraph *b*. Subparagraph (3.1) is added as follows.

(3.1) *Evaporator and condenser fan motor.*

Manufacturer	Standard Dayton, Inc.
Model	4730-1
Type	PM/Double extended shaft
Serial	J23040
RPM (High speed/ low speed)	3450/175
HP (High speed/ low speed)	1.42/0.18
Voltage	208 volts A.C.
Phase	3
Frequency	50/60 Hertz
Current (High speed/ low speed)	4.2/1.1 amperes
Duty	Continuous

Drive ..... Direct

Paragraph *b*. Subparagraph (4.2) is added as follows.

(4.2) *Compressor.*

Manufacturer ..... Carrier
Model 6A26M-179
Part Number 13211E3793-4
Type ..... Reciprocating
Lubrication ..... Forced feed
RPM 3390
Voltage ..... 208 volts
Phase 3
Frequency ..... 50.60 Hertz
LRA (Locked rotor amperage) 54.0
Weight ..... 83 lbs
Oil change ..... 2.5 pts (40 Oz.)
Oil type ..... Texaco Capella "BI" or Sunisco 3 G

Paragraph *b*(5), line 2. Change "19,800 BTU/HR actual at "to read, "19,300 BTU/HR actual at"

Subparagraph *b*(7). Item 5 is changed as follows.

Electrical rating ... 15 amps resistive at 250 VAC
5 amps inductive at 250 VAC
7 amps inductive at 125 VAC

Paragraph *b*(9). Line 6 is changed from "132 (±10%) ohms" to read, "178 (±10%) ohms,"

Add the following.

Nominal pick up voltage ..... 21 VDC @ 25°C.

Paragraph *b*(11), line 2. "Part number — ERF212B1" is changed to read, "Part number — SS0329."

Paragraph b(14), line 3. "Actuating pressure. — 400 (±16) psig" is changed to read, "Cut out pressure ... 350 (±16) psig."

Paragraph *b*(16), lines 1 and 2. "Manufacturer — Chromalox" and "Part number — 1-87150", are changed to read, "Manufacturer — General Electric," "Part number — 13211E8353-1."

Paragraph *b*(18), lines 5 and 6. "Cutout point — 445(±10) psig" and "Manual reset — 400 psig" are changed to read, "Cutout point — 460 (±10) psig" and "Manual reset — 415 psig."

Paragraph *b*(19) is deleted.

Paragraph *b* (20) is deleted.

Paragraph 1-4*b*(21) is superseded as follows.

(21) *Pressure relief valve.*

Manufacturer ..... Fluid Regulator Co.
Part number C1503-01
Setting ..... 540 (± 10%) psig

Paragraph 1-4*b*(25) is superseded as follows.

(25) *Condenser bypass expansion valve.*

Manufacturer ..... Alco
Part number TCL75C15A
Type ..... Angle
Inlet ..... ¼ in. ID
Outlet ..... ⅜ in. ID
Superheat setting ..... 25° (±1.5°F.
Capacity ..... ¾ ton

Paragraph 1-4*b*(26), line 3. "Part number — 70237-131" is changed to read, "Part number — 70237-133"

Paragraph 1-4*b*(27) is superseded as follows.

(27) *Service valves (suction and discharge).*

Manufacturer ..... Fluid Regulator Co.
Part number V2S-4
No. per unit 2
Rating ..... 0-1500 psi

Paragraph 1-4*b*(29) is superseded as follows.

(29) *Evaporator and condenser coils.*

Manufacturer ..... Sunstrand
Type ..... Aluminum tube and fin
No. per unit ..... 1 each
Part No. (evaporator) 13215E9836
Part No. (condenser) 13215E9837

Paragraph 1-4*b*(30) is superseded as follows.

(30) *RFI filter.*

Manufacturer ..... Captor Corp
Part Number A1444

Paragraph 1-4*(b)*(31) is superseded as follows.

(31) *Dimensions and weight.*

Width ..... 17.12 in.
Depth:
Top ..... 19.58 in.
Bottom ..... 19.73 in. — 19.96 in.
Height ..... 45.41 in. — 45.60 in.
Weight ..... 260 lbs

Paragraph 1-4*b*(32) is superseded as follows.

(32) *Capacities.*

Compressor crankcase oil:
Amount ..... 40 oz
Recommended type ..... Texaco Capella B1 or Sunisco 3 G
Refrigerant charge ..... See paragraph 1-5
Refrigerant type R-22

Paragraph 1-4*(b)*(34) is superseded as follows.

(34) *Wiring diagram.* Refer to figure 1-4 for wiring diagram. Refer to figure 1-4.1 sheets 1 and 2 for wiring diagram of Air Conditioner Models F18T-2.

Page 1-2. **Figure 1-1.2 is added as follows.**

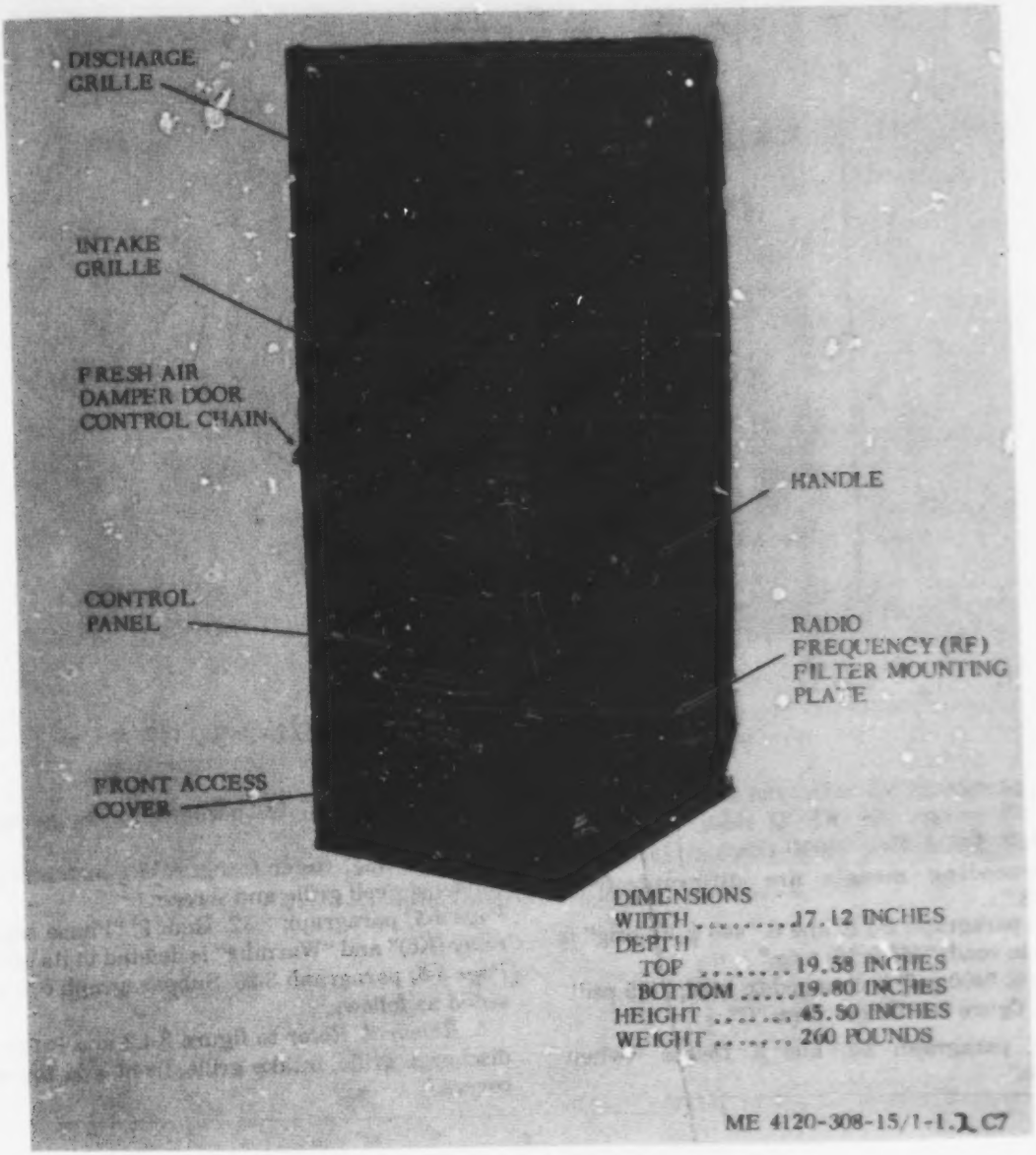
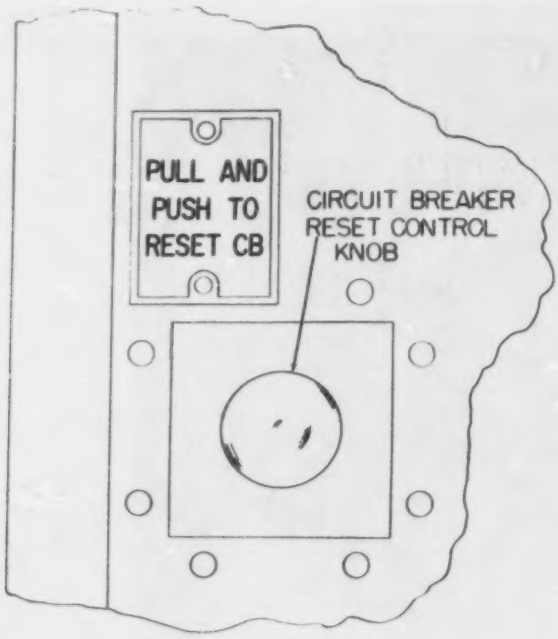


Figure 1-1.2. Air conditioner, right front three quarter view with shipping dimensions.

Page 1-3. Figure 1-2.3 is added as follows.



ME 4120-308-15/1-2.3. C7

Figure 1-2.3. Circuit breaker reset control knob.

Page 1-7, paragraph 1-5, at the end of the paragraph add the following. "The KECO Model F18T-2 air conditioner Serial Nos. 75036 through 75150 and their preceding models are different from CH621968."

Page 2-6, paragraph 2-7 *b*, line 5. "445 (±10) psig" is changed to read, "460 (±10) psig."

Line 8. "400 psi" is changed to read, "415 psi".

Page 2-8, figure 2-5. Delete view "C".

Page 3-1, paragraph 3-2, line 3. Delete "(when published)."

Paragraph 3-7. Subparagraph *c* is superseded as follows.

c. Servicing. Refer to figure 3-1 and service the condenser coil grille and screen.

Page 3-5, paragraph 3-12. Item 2, "Phase sequence relay (K6)" and "Warning" is deleted in its entirety.

Page 3-6, paragraph 3-20. Subparagraph *b* is superseded as follows.

b. Removal. Refer to figure 3-4.2 and remove the discharge grille, intake grille, front and top access covers.

Page 3-7. **Figure 3-3.1 is added as follows.**

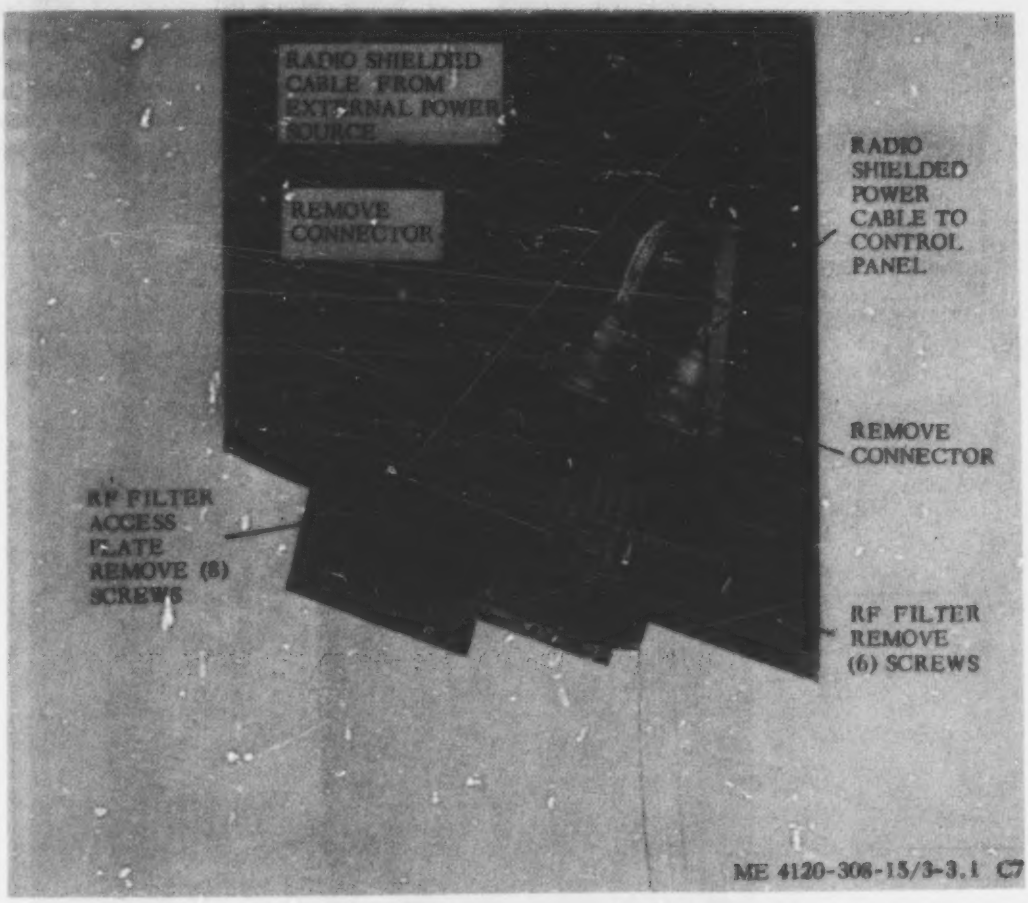

RADIO SHIELDED CABLE FROM EXTERNAL POWER SOURCE
REMOVE CONNECTOR
RADIO SHIELDED POWER CABLE TO CONTROL PANEL
REMOVE CONNECTOR
RF FILTER ACCESS PLATE REMOVE (8) SCREWS
RF FILTER REMOVE (6) SCREWS
ME 4120-306-15/3-3.1 C7

Figure 3-3.1. Radio interference suppression components.

Page 3-8. **Figure 3-4.2 is added as follows.**

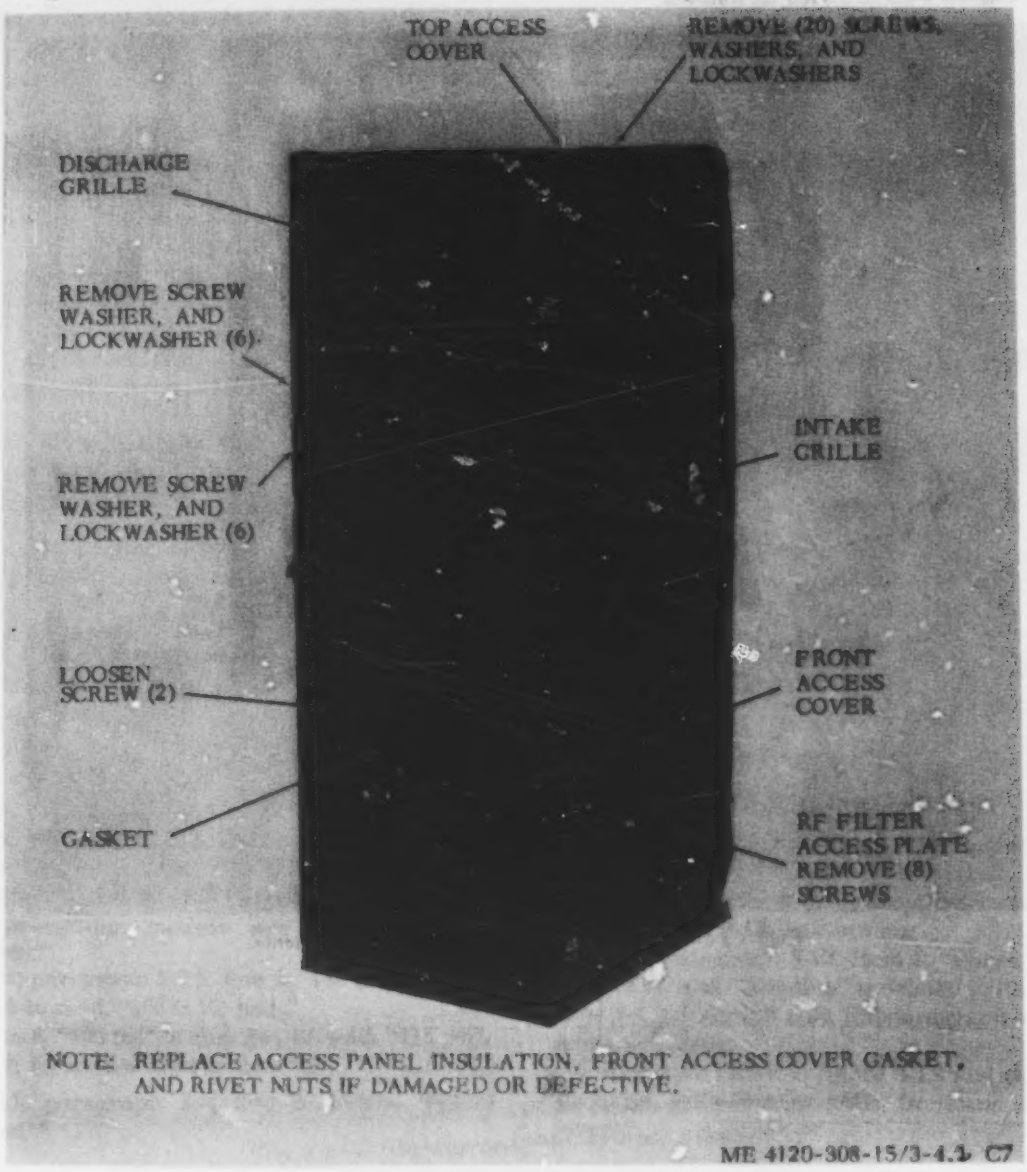

TOP ACCESS COVER
REMOVE (20) SCREWS, WASHERS, AND LOCKWASHERS
DISCHARGE GRILLE
REMOVE SCREW WASHER, AND LOCKWASHER (6)
INTAKE GRILLE
REMOVE SCREW WASHER, AND LOCKWASHER (6)
LOOSEN SCREW (2)
FRONT ACCESS COVER
GASKET
RF FILTER ACCESS PLATE REMOVE (8) SCREWS
NOTE: REPLACE ACCESS PANEL INSULATION, FRONT ACCESS COVER GASKET, AND RIVET NUTS IF DAMAGED OR DEFECTIVE.
ME 4120-308-15/3-4.1 C7

Figure 3-4.2. Discharge grille, intake grille, front and top access covers, RF filter access plate removal and installation.

Page 3-13, paragraph 3-30*a*, line 5. Delete "the phase sequence relay."

Page 3-17, paragraph 3-31. After *a*(4) add the following.

NOTE

Air conditioner, Keco Model F18T-2, does not contain a phase sequence relay.

Paragraph 3-31*b*(1), line 6. Change "400 (±16) psig" to read, "391 (±16) psig."

Page 3-21, paragraph 3-36. Subparagraph *b* is superseded as follows:

b. Testing.

(1) Remove condenser fan (para 3-24 and baffle fig. 3-16)

(2) Remove fan motor.

(3) Remove the cable connector at the fan motor.

(4) Refer to the fold-out wiring diagram figure 1-4 and check at the motor connector for continuity of the high speed motor windings, pins GIIJ, and for continuity of the low speed windings, pins DEF. On the high speed motor winding there should be a resistance reading of 4.67 ohms between connector terminals G-H, G-J, and H-J. On the low speed motor winding there should be a resistance of 35.62 ohms between connector terminals D-F, D-E, and E-F.

(5) Place one probe of the continuity tester against the motor housing and the other probe against each pin: D, E, F, G, H, J, of the motor

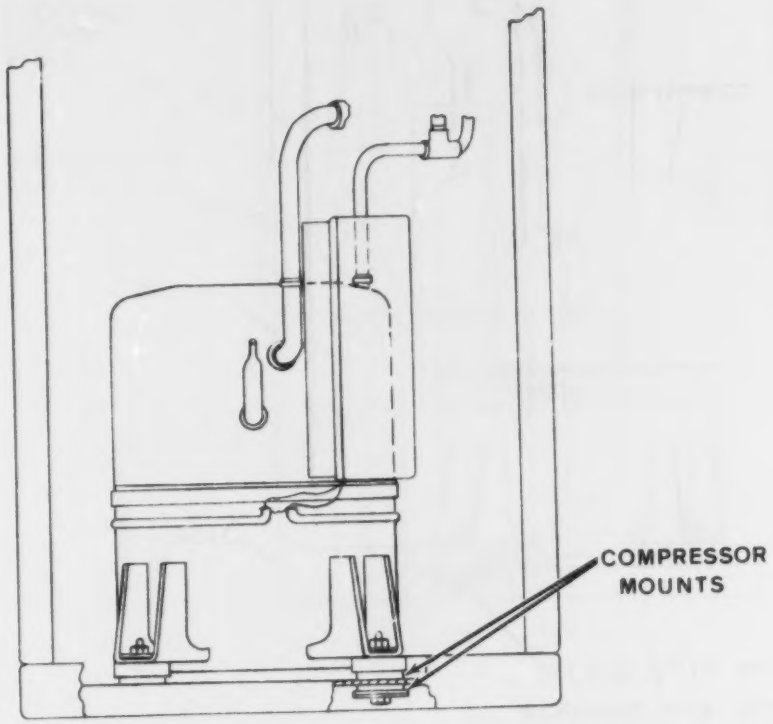
connector. If continuity is indicated between any terminal and the motor housing, the motor is defective and must be replaced.

Page 3-22. Paragraph 3-37*a* is superseded as follows.

a. General. The resilient washers of the motor mount cushions motor vibration and aids in alining the condenser and evaporator fans in the inlet rings and casing. Four sizes of resilient washers are available as follows:

(1) 13215E9824-1	0.094 in.
(2) 13215E9824-2	0.125 in.
(3) 13215E9824-3	0.156 in.
(4) 13215E9824-4	0.188 in.

Page 3-25. Figure 3-17.1 is added as follows.



ME 4120-308-15/3-17.1 C7

Figure 3-17.1. Refrigerant compressor mounts.

Page 5-3, paragraph 5-9. Subparagraph *a*(4) is superseded as follows:

(4) Refer to figure 5-1 and remove the evaporator coil.

Subparagraph *a*(5) is deleted.

Page 5-17, paragraph 5-24, line 5. "400 (±16) psig" is changed to read, "391 (±16) psig."

Page 5-18, figure 5-14.2 is added as follows.

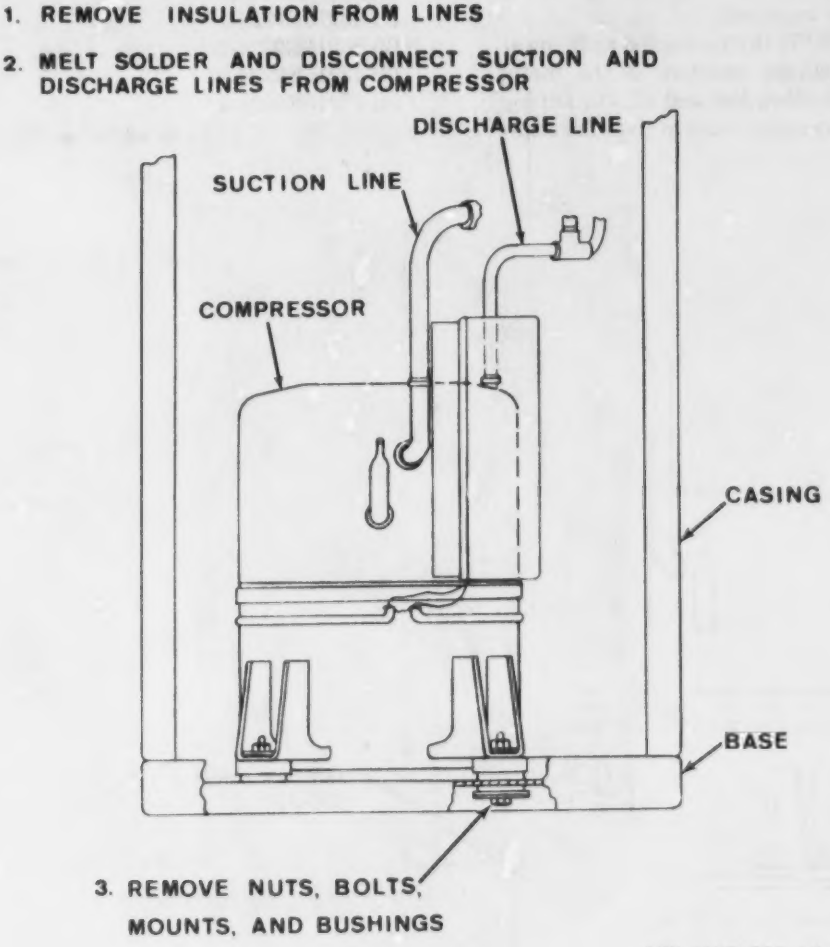


Figure 5-14.2. Compressor removal and installation.

Page 5-18. Paragraph 5-28 is deleted.

Page 5-22. Paragraph 5-29 is deleted.

Page 5-23. For the F18T-2 Air Conditioner, figure 5-18 does not apply.

Page 5-24, paragraph 5-32*a*. Delete the last two sentences, and add the following: "Turn the valve stems counter-clockwise to open valves."

Paragraph 5-32*c* and Note is superseded as follows:

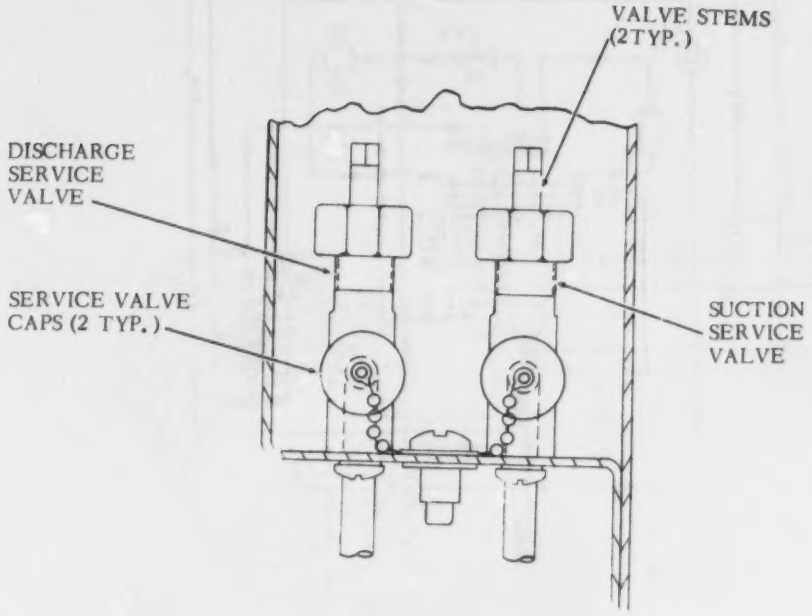
c. Repair. The service valves are repaired by replacing the valves. Refer to figure 5-20.1. To remove the service valves disconnect the flare connections.

Subparagraph *d*(1) is superseded as follows:

(1) Install the service valves in reverse order of removal, and reconnect the flare connection.

Subparagraph *d*(2) is deleted.

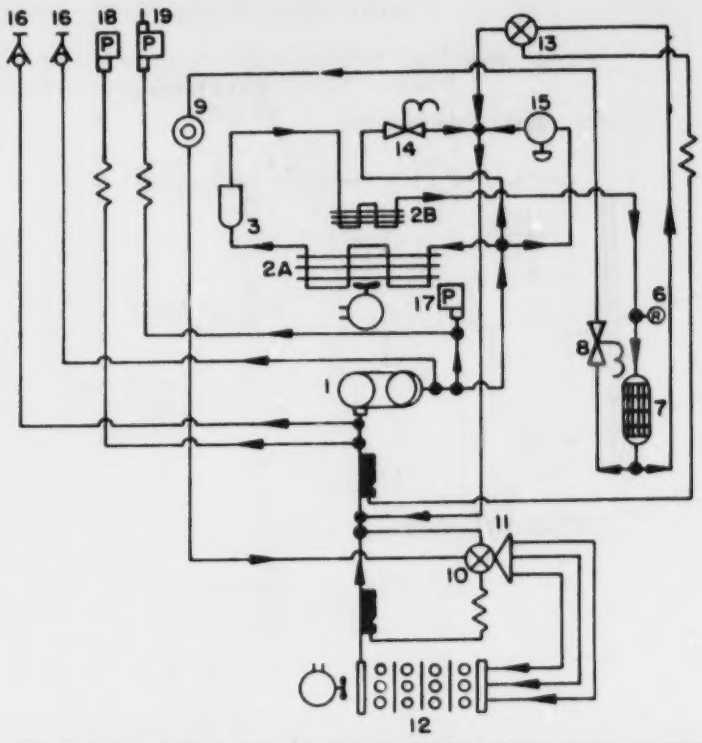
Page 5-25. **Figure 5-20.1 is added as follows.**



ME 4120-308-15/5-20.1 C7

Figure 5-20.1. Service valves.

Page 6-2. Figure 6-1.2 is added as follows.



FIND NO.	PART NO.	QTY	NOMENCLATURE
1	D13211E3793-1	1	COMPRESSOR (3 PHASE, 400 CPS, 208 V)
OR 1	D13211E3793-4	1	COMPRESSOR (3 PHASE, 60 CPS, 208 V)
OR 1	D13211E3793-5	1	COMPRESSOR (1 PHASE, 60 CPS, 230 V)
2A	D13215E9837	1	COIL, CONDENSER
2B	PART OF FIND NO 2A	1	SUBCOOLER
3	C13215E9833	1	RECEIVER
6	B13211E8369	1	VALVE, PRESSURE RELIEF
7	C13214E3793	1	DEHYDRATOR, DESICCANT, REFRIGERANT
8	D13214E4224-5	1	WIRING ASSEMBLY, VALVE, SOLENOID
9	C13211E8218	1	GLASS, SIGHT
10	C13215E9839	1	VALVE, EXPANSION
11	C13214E3986-3	1	RESTRICTOR, FLUID FLOW
12	D13215E9836	1	COIL, EVAPORATOR
13	C13214E3785	1	VALVE, EXPANSION
14	D13214E4224-6	1	WIRING ASSEMBLY, VALVE, SOLENOID
15	C13211E3800	1	VALVE, PRESSURE REGULATING
16	C13219E9499-1	2	VALVE, CHARGING WITH CAP C13219E9540
17	PART OF HARNESS	1	SWITCH, PRESSURE
	D13215E9918		
18	C13214E4309	1	SWITCH, PRESSURE
19	C13211E8404	1	SWITCH, HIGH PRESSURE CUTOUT

ME 4120-308-15/6-1.2 C7

Figure 6-1.2. Refrigerant flow diagram.

Page 6-3, paragraph 6-4. Subparagraph *a* is superseded as follows:

a. Equipment Testing. In order to gain access to fan motor electrical connector pins, fan motor must be removed from unit. For removal of fan motor refer to paragraph 3-36*c*. To test fan motor refer to paragraph 3-36*b*.

b. Removal. Deleted.

Page 6-4. **Figure 6-2.1 is added as follows.**

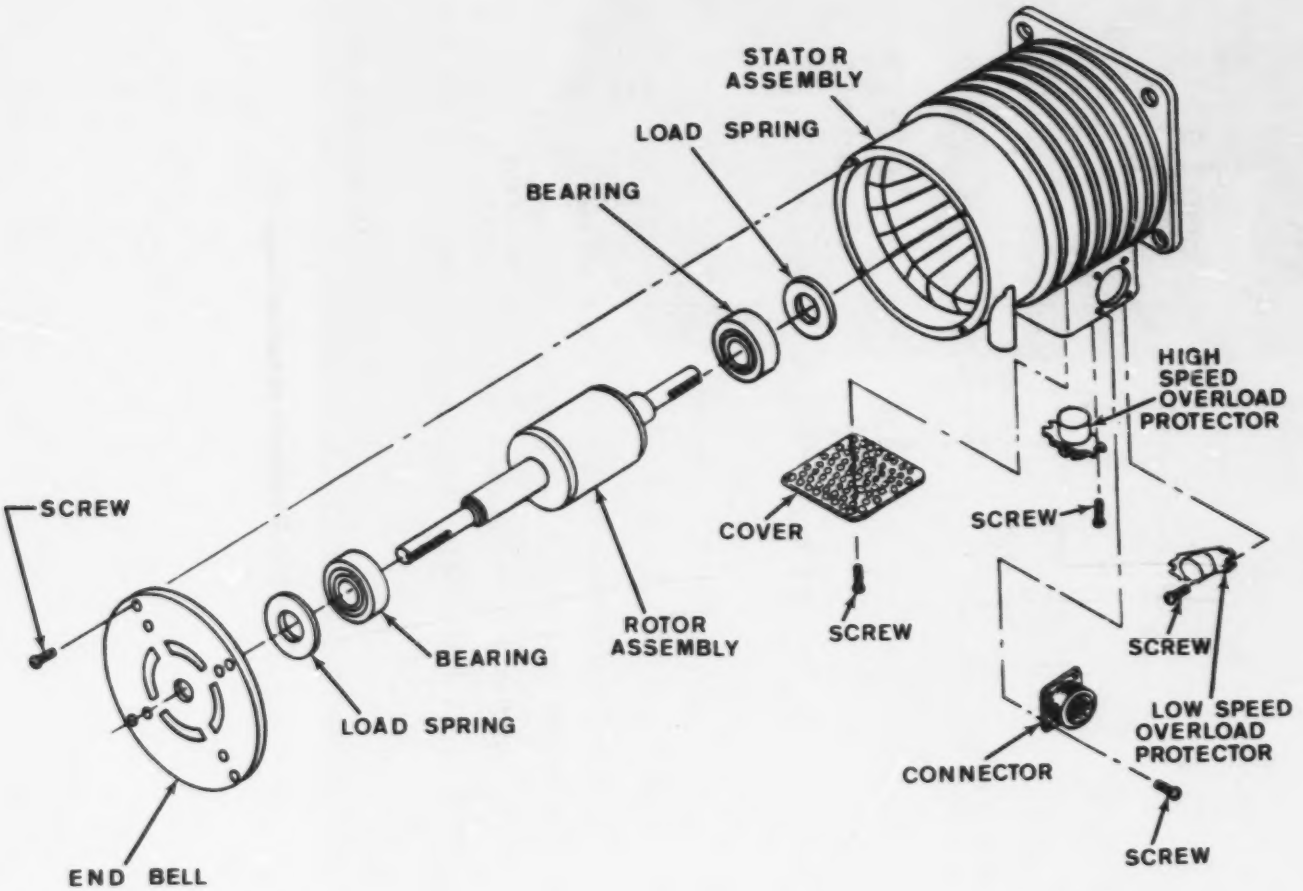
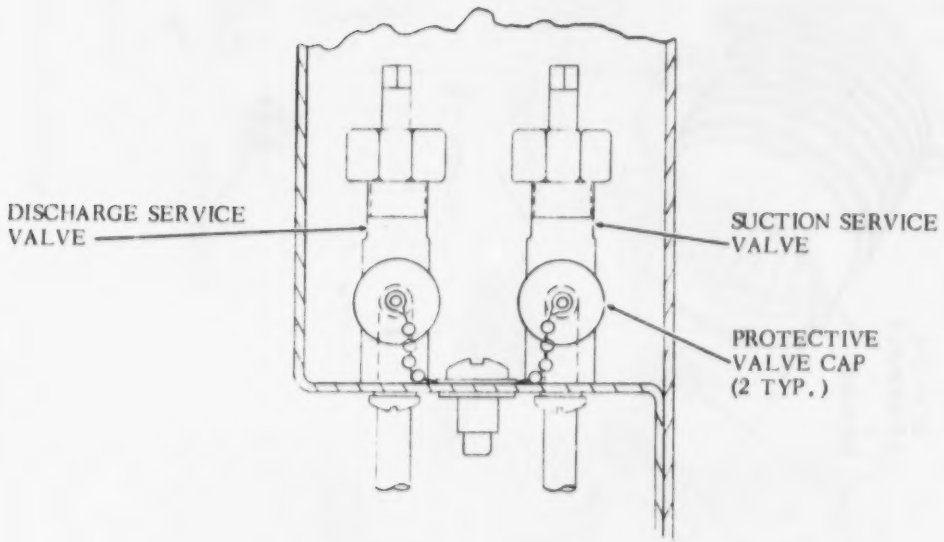


Figure 6-2.1. Motor disassembly and reassembly.

Page 6-5. **Figure 6-3.1 is added as follows.**

WARNING: AVOID BODILY CONTACT WITH LIQUID REFRIGERANT AND AVOID INHALING REFRIGERANT GAS. BE ESPECIALLY CAREFUL THAT REFRIGERANT DOES NOT CONTACT THE EYES. IN CASE OF REFRIGERANT LEAKS, VENTILATE THE AREA IMMEDIATELY. WEAR GOGGLES WHEN SERVICING REFRIGERANT SYSTEM.



STEP 1: REFER TO FIGURE 3-6 AND REMOVE THE FRESH AIR INLET SCREEN.

STEP 2: REMOVE CAP AND CONNECT A HOSE SECURELY TO THE SUCTION SERVICE VALVE AND LOOSELY TO AN EMPTY REFRIGERANT TANK. DISCHARGE REFRIGERANT TO AN OUTSIDE AREA.

NOTE: HOSES MUST HAVE VALVE CORE DEPRESSORS.

ME 4120-308-15/6-3.1 C7

Figure 6-3.1. Draining the refrigerant charge.

Page 6-11. **Figure 6-5, Sheet 4 is added as follows.**

STEP 4: OPEN REFRIGERANT DRUM SHUTOFF VALVE AND CLOSE SUCTION SERVICE VALVE. OPERATE UNIT (PAR. 2-8) AND WEIGH IN 7.5 LB CHARGE OF REFRIGERANT-22. CONTINUE ADDING REFRIGERANT SLOWLY UNTIL SIGHT GLASS INDICATES FULL (CLEAR).

NOTE: OPERATE UNIT IN COOL POSITION ONLY DURING SERVICING OPERATION.

STEP 5: PARTIALLY BLOCK DISCHARGE GRILLE WITH A CARDBOARD BAFFLE. ADJUST BAFFLE UNTIL SUCTION PRESSURE GAUGE READS 55 PSIG. CONTINUE ADDING REFRIGERANT SLOWLY, WHILE MAINTAINING 55 PSIG SUCTION PRESSURE BY ADJUSTING THE BAFFLE, UNTIL THE DISCHARGE PRESSURE GAUGE INDICATION CORRESPONDING TO THE AMBIENT TEMPERATURE IS OBTAINED.

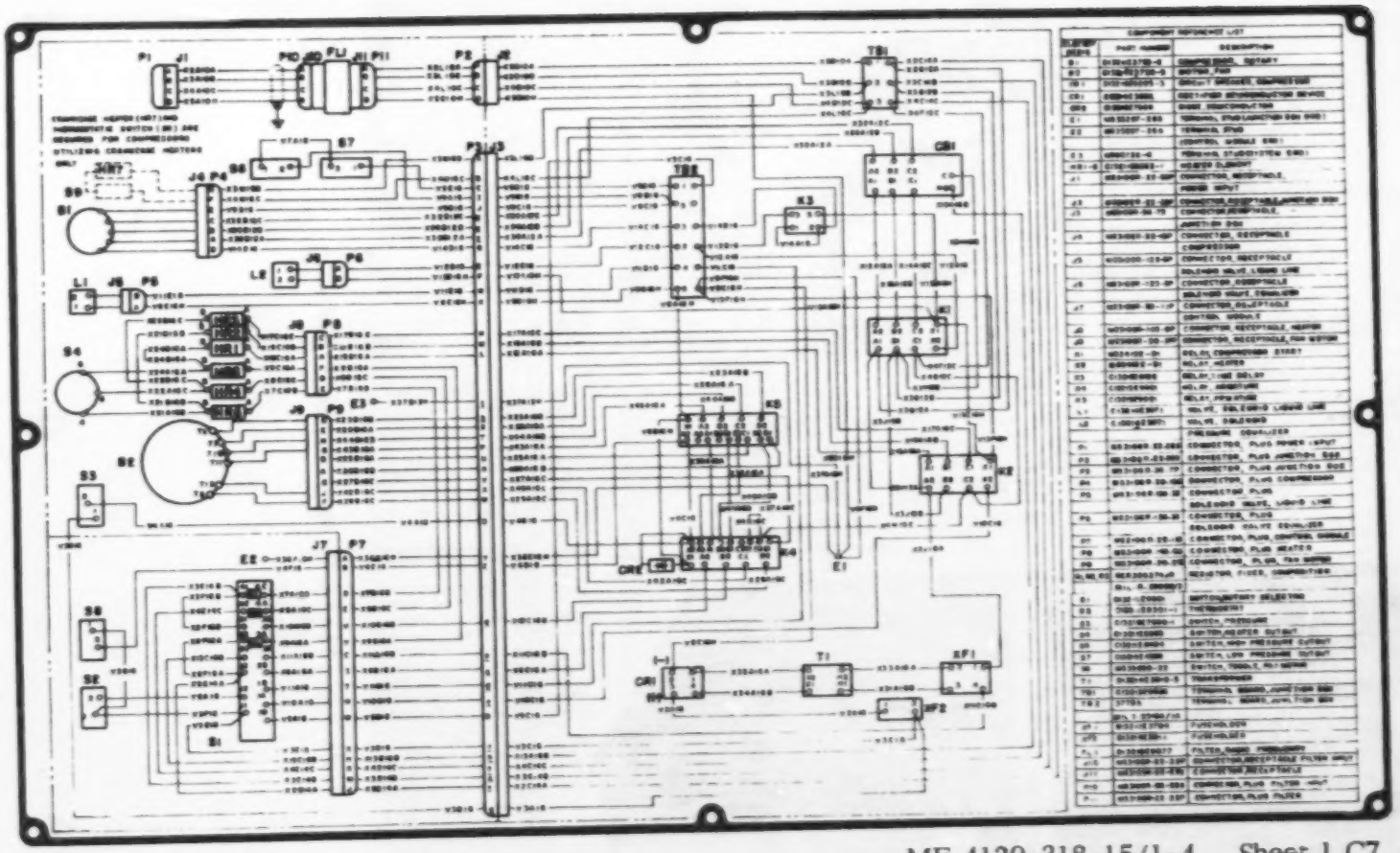
STEP 6: CLOSE SERVICE VALVE AND CLOSE REFRIGERANT DRUM SHUTOFF VALVE. STOP THE UNIT (PAR. 2-10). DISCONNECT MANIFOLD HOSES FROM SERVICE VALVES. INSTALL CAPS (STEP 2) AND SCREEN (STEP 1).

NOTE: SET THERMOSTAT ABOVE AMBIENT OR ROOM TEMPERATURE.

ME 4120-308-15/6-5(4)

Figure 6-5. Charging the refrigerant system (sheet 4).

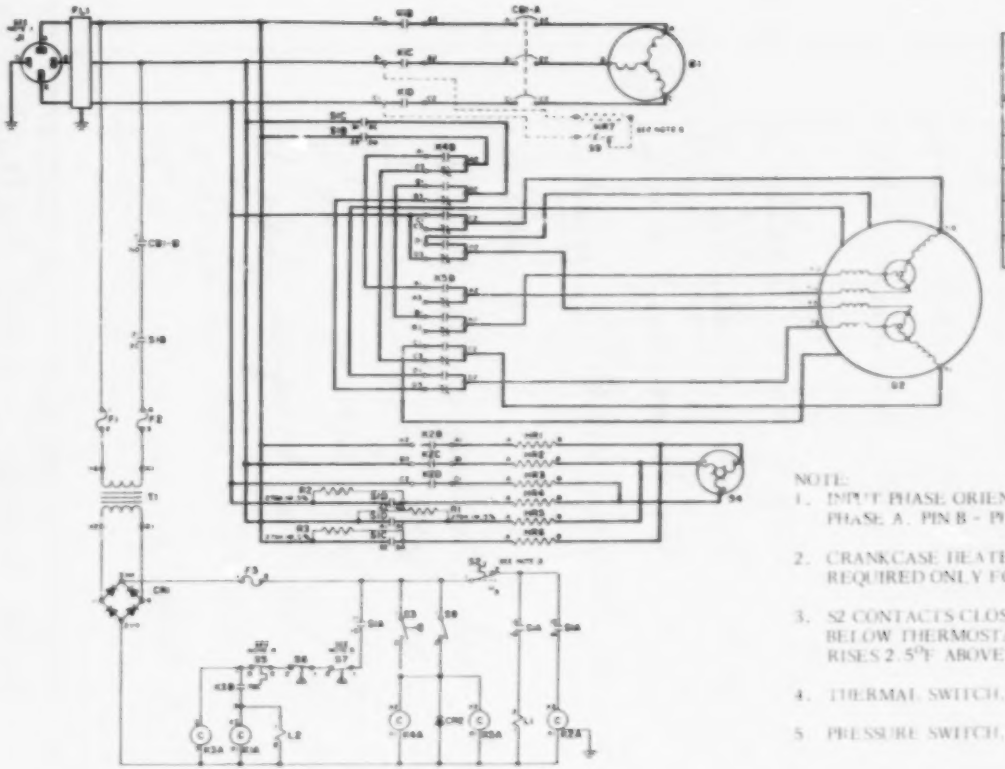
14 Figure 1-4 (Sheet 1) is superseded as follows.



ME 4120-318-15/1-4 Sheet 1 C7

Figure 1-4. Wiring diagram (sheet 1 of 2).

Figure 1-4 (Sheet 2) is superseded as follows.



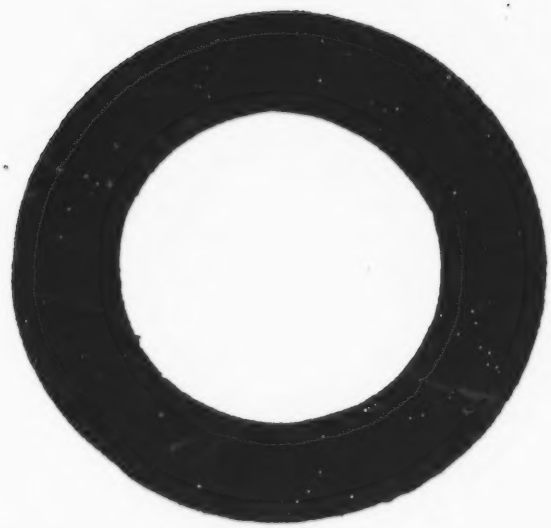
SELECTOR SWITCH (S1) POSITION	SWITCH FUNCTION	SWITCH WAFERS AND TERMINALS CONNECTED			
		S1A	S1B	S1C	S1D
1	HEAT (HIGH)	12 AND 1A	22 AND 2B 21 AND 2C	32 AND 3A 31 AND 3C	42 AND 4A 41 AND 4C
2	HEAT (LOW)	12 AND 1A	22 AND 2B 21 AND 2C	31 AND 3C	———
3	OFF	———	———	———	———
4	VENT	———	22 AND 2B 21 AND 2C	31 AND 3C	———
5	COOL	12 AND 1B 11 AND 1B	22 AND 2B 21 AND 2C	31 AND 3C	———

NOTE:

1. INPUT PHASE ORIENTATION FOR MAIN POWER RECEPTACLE: PIN A - PHASE A, PIN B - PHASE B, PIN C - PHASE C, PIN D - GROUND.
2. CRANKCASE HEATER (HR7) AND THERMOSTATIC SWITCH (S9) ARE REQUIRED ONLY FOR COMPRESSORS UTILIZING CRANKCASE HEATERS.
3. S2 CONTACTS CLOSE WHEN AMBIENT TEMPERATURES FALL 2.5°F BELOW THERMOSTAT SETTING AND OPEN WHEN AMBIENT TEMPERATURE RISES 2.5°F ABOVE THERMOSTAT SETTING.
4. THERMAL SWITCH, S5, IS PART OF COMPRESSOR MOTOR, B1.
5. PRESSURE SWITCH, S7, IS SHOWN IN PRESSURE ENERGIZED POSITION.

ME 4120-308-15/1-4 FO Str 2 C7

Figure 1-4. Wiring diagram (sheet 2 of 2).



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CoA, 3d ENGINEER BN
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DATE 16 DEC 74

PUBLICATION NUMBER	DATE	TITLE
TM5-6115-200-20 AND P	1 APR 72	GENERATOR SET 10 KW NSN 6115-00-231-7286

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.
6	2-1 a		
81		4-3	
125	line 20		

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

In line 6 of paragraph 2-1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders

SAMPLE

Callout 16 on figure 4-3 is pointing at a bolt. In the key to fig. 4-3, item 16 is called a shim. Please correct one or the other.

I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered so the NSN is wrong. Please give me a good NSN

TYPED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
JOHN DOE, PFC (268) 317-7111

SIGN HERE:
John Doe

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Distribution:
To be distributed in accordance with DA Form 12-25C, (qty rqr block No. 541) Operator maintenance requirements for Environmental Equipment Air Conditioners, 18,000 BTU Compact.

Changes in force: C1, C2, C3, C4, C6, C7 and C8

TM 5-4120-308-15
TO 35E9-139-1
C8

CHANGE

NO. 8

HEADQUARTERS
DEPARTMENTS OF THE ARMY
AND THE AIR FORCE
WASHINGTON, DC, *6 September 1977*

Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual

AIR CONDITIONER, COMPACT VERTICAL:
208 VOLT, 3 PHASE, 50/60 HERTZ,
18,000 BTU COOLING, 12,000 BTU HEATING,
AMERICAN AIR FILTER MODEL CH 620-2
(KECO INDUSTRIES, INC. MODEL F18T-2)
NSN 4120-00-168-1781

TM 5-4120-308-15, 6 November 1969, is changed as follows:

Page 1. Add the following immediately below the title:

REPORTING OF ERRORS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, (Recommended Changes to Publication and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U. S. Army Troop Support & Aviation Materiel Readiness Command, ATTN: DRSTS-MTPS, 4300 Goodfellow Boulevard, St. Louis, MO. 63120. A reply will be furnished to you.

Page 1-4. Paragraph 1-4b (4.1) is added as follows:

(4.1) Compressor

Manufacturer.....	Carrier Corp.
Part Number.....	6A26M179

All other characterisitics same as (4) above.

Page 5-17. Paragraph 5-23a. The sub-title is changed to read "Removal (Whirlpool Compressor)."

Following paragraph 5-23c, add the following:

d. Replacing Whirlpool Compressor with Carrier Compressor.

(1) Remove the whirlpool compressor a above. Also remove clamp securing wiring harness to bottom of partition panel (31, fig. 5-16).

NOTE

Make sure that all wiring harness, insulation, and other near-by component parts are protected from direct flame or damaging heat when unsoldering or soldering tubing.

(2) Refer to figure 3-3 and remove RF1 filter. Reinstall the two screws and nuts that attached filter in the bracket lower holes and secure bracket.

(3) Using available metal material, fabricate a strap-like bracket and secure RF1 filter in left-hand corner of partition panel in condenser section above compressor, as indicated on figure 5-16.1. Fasten RF1 filter to partition panel with power source connector plug pointed to right side of panel.

This Change supersedes C5, 5 March 1974.

NOTE
Do not remove insulation from partition panel. Removal would cause exposed panel to sweat.

(4) Rework existing suction and discharge tubing as required to ensure mating of compressor inlet and outlet tubes. Remove plug from compressor process tube. Install new dehydrator (para 5-21).

(5) Install compressor in required mounting location using compressor mounts removed from Whirlpool compressor. The electrical junction box of the Carrier Compressor will face toward right side panel when properly installed.

(6) Prepare compressor suction and discharge tubing for soldering. Using a suitable pressure regulator, connect a cylinder of dry nitrogen to suction service valve. Allow a flow of nitrogen to sweep thru system at a rate of approximately 1 psig pressure. Observing note in (1) above, solder tubing joints with silver solder of 50 percent silver capacity and melting point of approximately 1160F.

(7) Pressure test, evacuate, and recharge refrigerant system (para 6-5).

(8) Add wiring to connect electrical power to compressor crankcase heater as follows:

(a) Connect wire between terminal 2 of TB1 and pin "A" of connector J3. (fig. 5-16.2).

(b) Connect wire between terminal 3 of "TB1" and pin "B" of connector J3.

(c) Connnect wire between pin "A" of connector P3 and pin "G" of connector P4.

(d) Connect wire between pin "B" of connector P3 and pin "F" of connector P4.

(9) Install wiring harness, junction box, and panels.

e. Testing Carrier Compressor.

(1) Disconnect wiring harness at electrical junction box of compressor and remove junction box cover.

(2) Make sure compressor housing is cool to touch before testing, to assure that internal motor protection thermostat is closed. Use a multimeter to make continuity tests for open or grounded motor windings.

f. Removing Carrier Compressor.

(1) Remove front access cover, junction box and wiring harness at compressor connector plug.

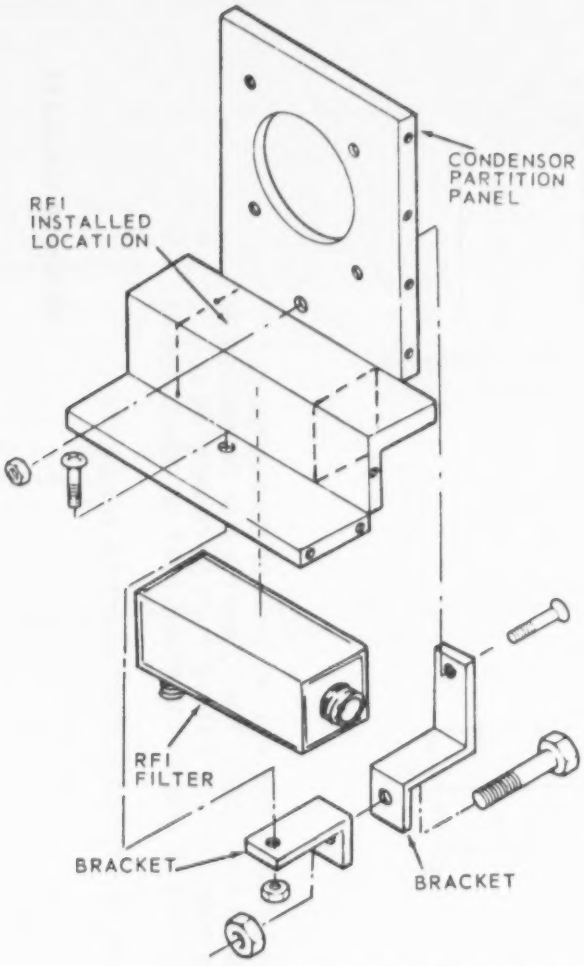
(2) Sweep refrigeration system with dry nitrogen as described in d(6) above. Observing note in d(1) above, unsolder suction and discharge tubing. Immediately seal open refrigeration system tubing and compressor outlets if compressor is to be reused.

(3) Remove compressor mounting bolts and lift compressor from base.

g. Installing Carrier Compressor.

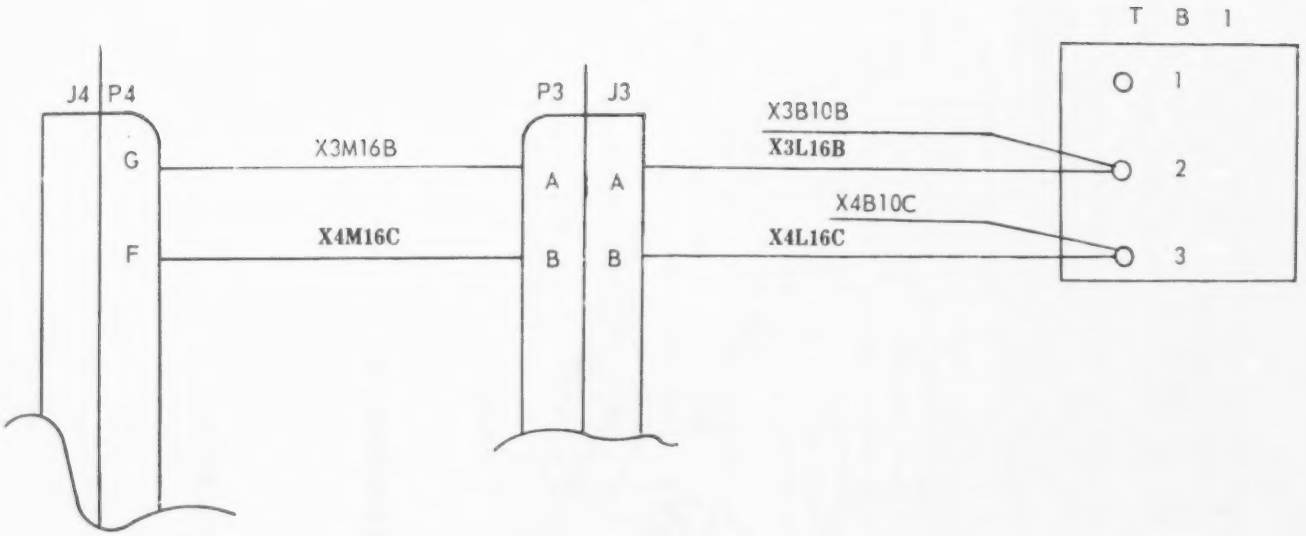
(1) Install compressor in reverse order of removal.

(2) Pressure test, evacuate, and recharge system (para 6-5).



ME 4120-308-15/5-16.1 C8

Figure 5-16.1 Relocation of RFI Filter.



A. X3L16B BETWEEN TERMINAL 2 OF TB1 AND PIN A OF CONNECTOR J3
B. X3M16B BETWEEN PIN A OF CONNECTOR P3 AND PIN G OF CONNECTOR P4
C. X4L16C BETWEEN TERMINAL 3 OF TB1 AND PIN B OF CONNECTOR J3
D. X4M16C BETWEEN PIN B OF CONNECTOR P3 AND PIN F OF CONNECTOR P4

NOTE: F & G HOOK UP WITH THE CRANKCASE HEATER & THERMOSTAT.

ME 4120-308-15/5-16.2 C8

Figure 5-16.2 Crankcase Heater Wiring Diagram.

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To be distributed in accordance with DA Form 12-25C, Operator maintenance requirements for Environmental Equipment: Air Conditioners, 18,000 BTU Compact.

Changes in Force: C1, C2, C3, C4, C5, C7, C8, and C9

TM 5-4120-308-15
TO 35E9-159-1
C9

CHANGE
NO. 9

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, *20 December 1978*

Operator, Organizational, Direct Support, General Support and Depot Maintenance Manual

AIR CONDITIONER, COMPACT VERTICAL, 208 VOLT, 3 PHASE 50/60 HERTZ, 18,000 BTU COOLING, 12,000 BTU HEATING, AMERICAN AIR FILTER MODEL CH620-2 (KECO INDUSTRIES, INC. MODEL F18T-2) NSN 4120-00-168-1781

TM 5-4120-308-15, 6 November 1969 is changed as follows:

Page 1-1. After paragraph 1-2 add the following.

1-2.1. **Hand Receipt**

Hand receipt for the End Item/Components of End Item (COEI), Basic Issue Items (BII), and Additional Authorization List (AAL) items are published in a hand receipt manual. The Hand Receipt Manual numerical designation is the same as the related Technical Manual with the letters HR added to the number. These manuals are published to aid in property accountability and are available through: Commander, US Army Adjutant General Publication Center, ATTN: AGDL-OD, 1655 Woodson Road, St. Louis, MO 63114.

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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *6 November 1969*

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT,
GENERAL SUPPORT, AND DEPOT MAINTENANCE MANUAL

AIR CONDITIONER, COMPACT VERTICAL, 208V, 3 PHASE, 18,000 BTUH COOLING: 12,000 BTUH HEATING, 50/60 HERTZ, AMERICAN AIR FILTER MODEL CH620-2, FSN 4120-168-1781

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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1–1. Scope

a. This manual is published for use by personnel to whom the Model CH620–2 Air Conditioner is issued. Chapters 1 through 3 include description, operating instructions, and operator and organizational maintenance instructions. Chapter 4 contains information for shipment, storage, and demolition. Chapters 5 and 6 provide instructions for direct support, general support, and depot maintenance.

b. Appendix A contains a list of publications applicable to this manual. Appendix B is a list of basic issue items authorized for the operator of this equipment. Appendix C contains the maintenance allocation chart.

1–2. Forms and Records

a. DA forms and records used for equipment maintenance will be only those prescribed in TM 38–750.

b. Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to the Commanding General, U.S. Army Mobility Equipment Command, ATTN: AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120.

Section II. DESCRIPTION AND DATA

1–3. Description

a. General. The air conditioner fig. 1–1 and 1–2) is used primarily in van-type enclosures for providing filtered, cooled, or heated air as required to maintain conditions necessary for the efficient operation of electronic equipment and for the comfort of operating personnel within the enclosure. It is a completely self-contained, air-cooled, electric motor-driven unit designed for continuous operation with varying loads. It is equipped with internal ducting, such that filtered air from a chemical and biological filter unit may be ducted to the evaporator fan and coil.

b. Condensing Section. The condensing section, located at the bottom of the unit, contains the hermetically sealed compressor, pressure relief valve, check valve, condensing coil, condenser air intake opening, condenser air discharge opening, control panel, junction box, thermostat, power receptacle, RFI filter, condenser fan, dehydrator, and compressor solenoid valve.

c. Evaporator Section. The evaporator section, located at the top of the unit, contains an evaporator coil, condenser and evaporator fans and motor, air conditioning filter, mist eliminator, intake and discharge grilles, evaporator coil drain pan, expansion valves, pressure equalizing solenoid valve, pressure regulator valve, electric heaters, sight glass, high-and low-pressure cutout switches, suction and discharge service valves, and a damper to regulate the amount of outdoor air entering the air conditioner.

1–4. Identification and Tabulated Data

a. Identification. The air conditioner has twelve major identification and instruction plates. Information contained on these plates is listed below.

(1) Corps of Engineers' plate, located near top on rear access cover, specifies nomenclature, manufacturer, model number, serial number, dimentions, weight, and capacity.

(2) Manufacturer's identification plate, located on rear panel just below sight glass, specifies model number and serial number of unit

(3) Compressor identification plate, located on compressor housing, specifies compressor model number, part number, serial number, manufacturer, refrigerant type, oil type and capacity, and electrical data.

(4) Fan motor identification plate, located on fan motor, specifies motor horsepower, type,

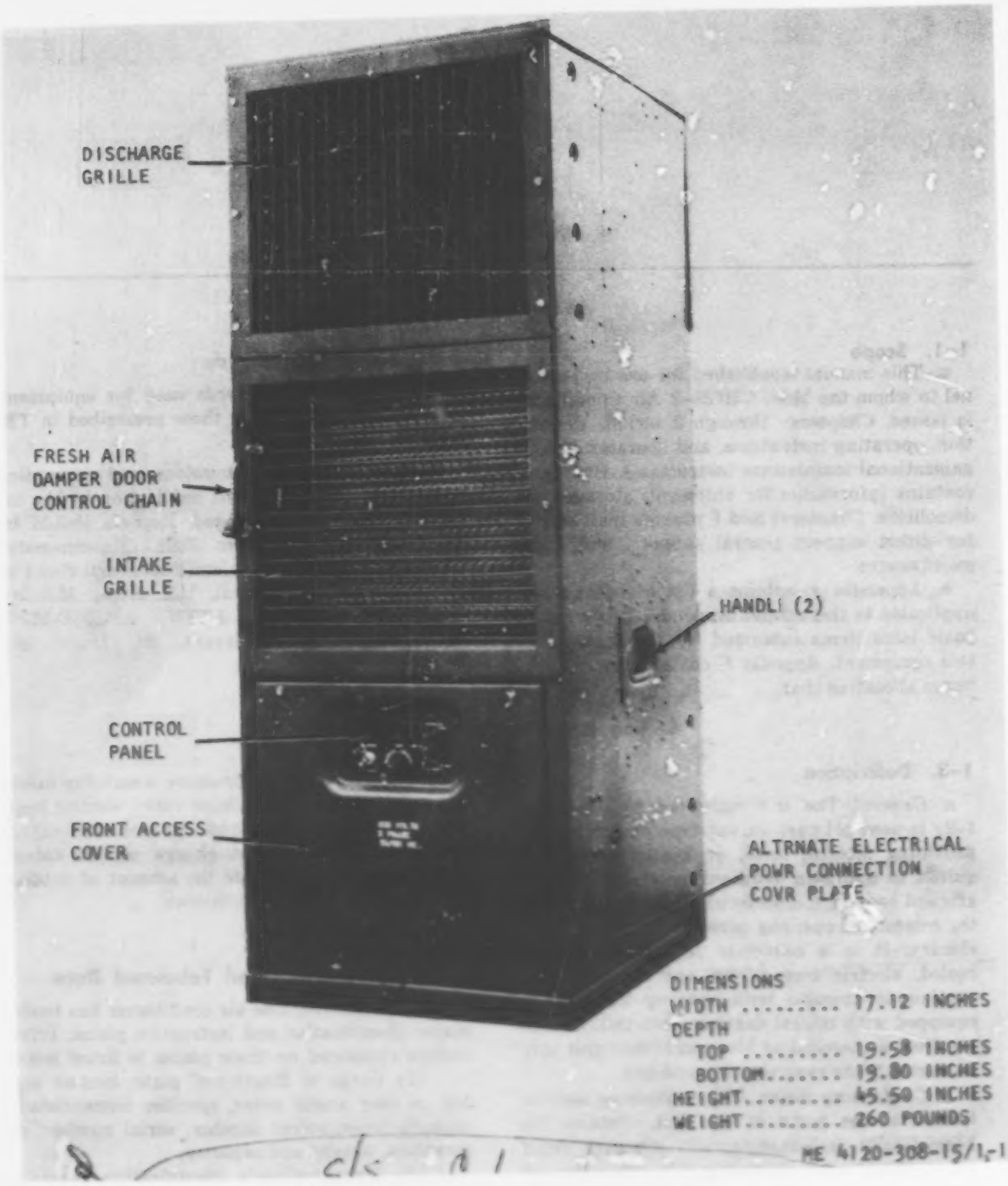

Figure 1-1. Air conditioner, left front three-quarter view, with shipping dimensions.

serial number, revolutions per minute, part number, and electrical characteristics.

(5) Control panel plate, located on control panel at front of unit, indicates operating mode, temperature setting, and fan speed.

(6) Wiring diagram plate, located on inside of front access cover, illustrates unit wiring.

(7) Refrigerant-22 plate, located on rear access cover above condenser fan guard, indicates refrigerant type and amount of charge.

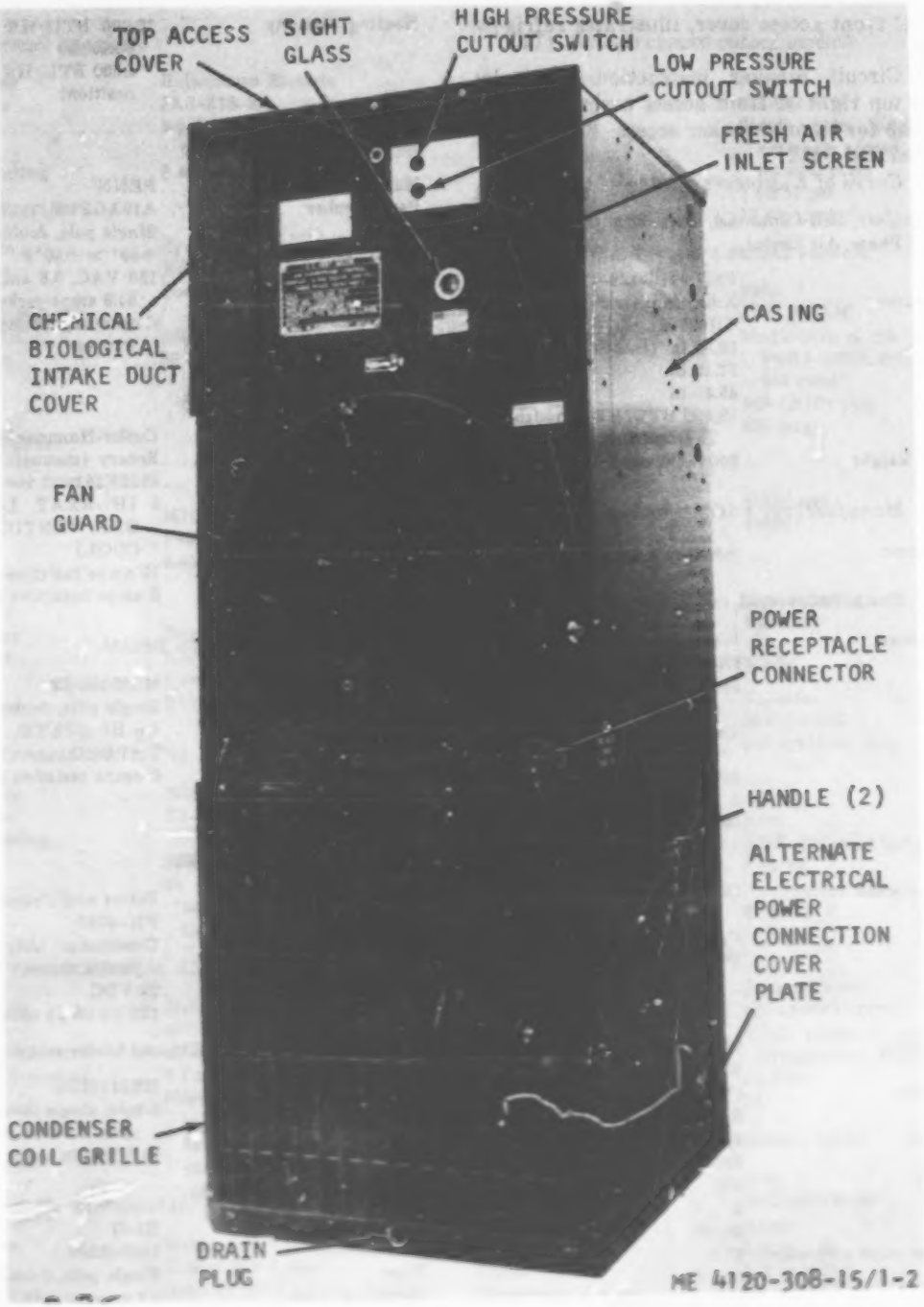

Figure 1-2. Air conditioner, right rear three-quarter view.

(8) Color indicating plate, located on rear access cover immediately below the refrigerant sight glass, has three color bands: green, chartreuse, and yellow, which are used in conjunction with the sight glass to determine moisture content of the refrigerant system.

(9) High- and low-pressure cutout switch reset plate, located on rear access cover, identifies the high-and low-pressure cutout switch reset buttons.

(10) Indicating arrow plate, located on rear access cover just above condenser fan guard, indicates the direction of fan rotation.

(11) Refrigeration fluid diagram, located on

outside of front access cover, illustrates refrigerant flow.

(12) Circuit breaker instruction plate, located on top right of front access cover, provides instruction for circuit breaker access.

b. Tabulated Data.

(1) *Corps of Engineers' plate.*

Air Conditioner, Self-Contained, Base Mtg., 208 VAC, 60 Hertz, 3 Phase, Air Cooled.

Stock No.	FSN 4120-168-1781
Manufacturer	American Air Filter
Model	CH620-2
Length	19.80 in. (inches)
Width	17.12 in.
Height	45.50 in.
Capacity	18,000 BTU/HR (British Thermal Units/Hour
Shipping weight	260 lbs (pounds)

(2) *Manufacturer's identification plate.*

Manufacturer	American Air Filter Co., Inc.

(3) *Evaporator and condenser fan motor.*

Manufacturer	Welco Industries
Type	Double extended shaft
RPM	3450 (HI SPEED) 1750 (LO SPEED)
HP	1.42 (3450 rpm) 0.18 (1750 rpm)
Volts	208
Phase	3
Cycles	60
Amperes (full load)	4.2 (3450 rpm) 0.8 (1750 rpm)
Amperes (locked rotor)	18.0 (3450 rpm) 3.5 (1750 rpm)
Duty	Continuous
Drive	Direct

(4) *Compressor.*

Manufacturer	Whirlpool
Model	WHP622H18-208-3
Part number	474837
Type	Rotary vane
Lubrication	Forced feed
RPM	3390
Volts	208
Phase	3
Cycles	50/60
Lra (locked rotor amperage)	67.0
Weight	56.1 lbs
Oil charge	20.5 oz (ounces)
Oil type	Texaco capella "D"

(5) *Performance data.*

Cooling capacity	18,000 BTU HR nominal 19,800 BTU/HR actual at 125°F, air to condenser, 90°F DB return air to unit at 1.0 SHR (sensible heat ratio)
Heating capacity	12,000 BTU/HR (HI-HEAT position) 6,000 BTU/HR (LO-HEAT position)

(6) *Thermostat.*

Manufacturer	PENN
Part number	A19AGF10
Action	Single pole, double throw
Operating range	+40° to +90°F
Electrical rating	120 VAC, 5.8 amps-full load, 34.8 amps-locked rotor
Shaft rotation	Clockwise, facing shaft for warmer

(7) *Rotary switch.*

Manufacturer	Cutler-Hammer
Type	Rotary (manual)
Part number	8912K261
No. of positions	5 (HI-HEAT, LO-HEAT, OFF, VENTILATE, COOL)
Electrical rating	15 amps resistive at 208 VAC 6 amps inductive at 208 VAC

(8) *Condenser fan switch.*

Part number	MS35058-22
Type	Single pole, double throw
Positions	Up-HI SPEED, down-LO SPEED
Electrical Rating	6 amps resistive at 208 VAC

(9) *Relays.*

Armature relay (K4 and K5).

Manufacturer	Potter and Brumfield
Part number	PM-4030
Type	Continuous duty, 4-pole, double throw
Coil voltage	28 VDC
Coil resistance	132 (±10%) ohms

Compressor start relay (K2) and heater relay (K1).

Part number	MS24192D1
Type	3-pole, single throw, normally open
Electrical rating	28 VDC, 25 amps

Phase sequence relay (K8).

Manufacturer	HI-G
Part number	1400-S506
Type	Single pole, double throw
Operation time	0.2 seconds max
Release time	0.2 seconds max
Electrical rating	0.25 amps at 208 VAC

Time delay relay (K6).

Manufacturer	Dialtron
Part number	FR-30S-NO-24
Type	Single pole, single throw, normally open
Time delay	20 (±10%) seconds from -65°C to +100°C
Electrical rating	3 amps resistive at 28 VDC

(10) *Circuit breaker.*

Manufacturer	Heinemann Electric
Part number	JA3–Z18–3
Type	3-pole, single throw, series-trip with auxiliary switch
Electrical rating	5 amps at 208 VAC

(11) *Rectifier.*

Manufacturer	Syntron
Part number	ERF212B1
Duty cycle	Continuous
Electrical rating	
AC input	208 VAC
DC output	30 (±3%) vdc at 3 amps (200 amps peak surge for 1 cycle at 40°C)

(12) *Fuses.*

Time lag power fuse.

Specification	MIL–F–15160/09
Type	F09B250V16/10A
Size	0.406 dia × 1 1/2 in. lg

Fuse.

Manufacturer	Bussmann
Part number	KAW5
Rating	5 amps at 125 volts
Size	0.406 dia. × 1 1/2 in. lg

(13) *Transformer (T1).*

Manufacturer	Milwaukee Transformer
Part number	C1–13490
Electrical rating	
Input	208 VAC at 60 Hertz
Output	30 (±3 %) volts root mean square at 2.2 amps continuous and 7.7 amps inrush

(14) *Pressure switch (S3).*

Manufacturer	Metals and Controls
Part number	6PS306M400M350J
Actuating pressure	400 (±16) psig
Pressure differential	5 (±10) psi
Operation	Normally open, closes on rising pressure, opens with falling pressure at pressure differential

(15) *Heater thermostat.*

Manufacturer	Metals and Controls
Part number	Klixon MWA1256
Operating range	Open at 90° (±5)°C, close at 61° (±9)°C
Type	Automatic reset
Electrical rating	208V, 60 and 400 Hertz, 3-phase resistive load

(16) *Electric heaters.*

Manufacturer	Chromalox
Part number	1–871510
No. per unit	6
Voltage	120
Watts	400

(17) *Low-pressure cutout switch.*

Manufacturer	Penn
Part number	210AP10AN
Switch action	Single pole, single throw, normally closed, trip free manual reset
Cutout point	7 (±5) psi
Differential	12 (±) psi

(18) *High-pressure cutout switch.*

Manufacturer	Penn
Part number	210AP40AN
Switch action	Single pole, single throw, normally closed, trip free manual reset
Cutout point	445 (±10) psig
Manual reset	400 psig

(19) *Suction filter.*

Manufacturer	Whirlpool
Part number	475827

(20) *Check valve.*

Manufacturer	Superior
Part number	802A–6S

(21) *Pressure relief valve.*

Manufacturer	Superior
Part number	3001X4–540
Setting	540 (±10%) psig

(22) *Dehydrator.*

Manufacturer	Alco
Part number	ADK–083
Effective volume of desiccant.	8 cu in.
Water capacity in drops	89 at 75°F

(23) *Solenoid valves.*

Manufacturer	Jacks-Evans
Part number	0B241
No. per unit	2 (1 pressure equalizer, 1 compressor bypass)
Voltage	24 VDC
Watts	14

(24) *Evaporator expansion valve.*

Manufacturer	Alco
Part number	TCL100HW100
Type	Angle
Inlet	3/8 in. OD
Outlet	5/8 in. OD
Superheat setting	6 (±1.5)°F
Capacity	1 ton

(25) *Condenser bypass expansion valve.*

Manufacturer	Alco
Part no.	TCL75C15B
Type	Angle
Inlet	1/4 in. OD
Outlet	3/8 in. OD
Superheat setting	15 (±1.5)°F
Capacity	3/4 ton

(26) *Pressure regulating valve.*

Manufacturer	Controls Company of American
Model	237AVL
Part number	70237-131
Setting	60 psig
Capacity	2.2 tons

(27) *Service valves (suction and discharge).*

Manufacturer	Robinair
Part number	VUS3-46AC
No. per unit	2
Rating	600 psig

(28) *Sight glass.*

Manufacturer	Sporlan
Type	SAK13
Moisture indication	
Dry	Green
Caution	Chartreuse
Wet	Yellow

(29) *Evaporator and condenser coils.*

Manufacturer	Bohn
Type	Aluminum tube and fin
No. per unit	1 each
Part No. (evaporator)	M4448-1
Part No. (condenser)	M4449-1

(30) *RFI filter.*

Manufacturer	Potter
Part number	5003-4243

(31) *Dimensions and weight.*

Width	17.12 in.

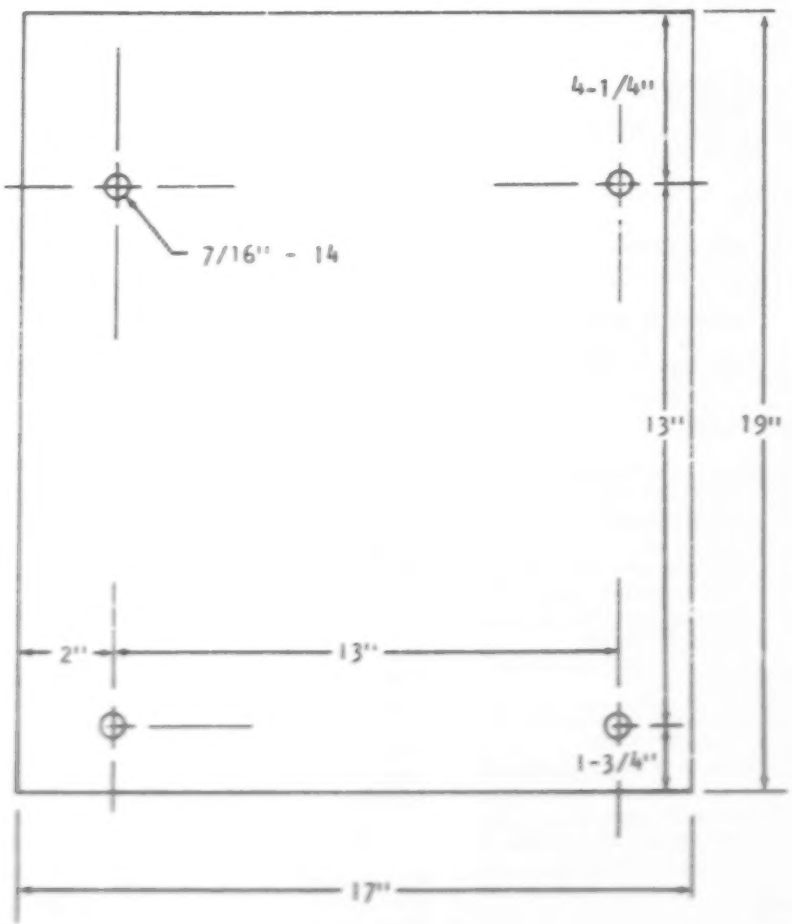

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Figure 1-1. Mount plate.

Depth	
Top	19.58 in.
Bottom	19.80 in.
Height	45.50 in.
Weight	260 lbs

(32) *Capacities.*

Compressor crankcase oil	
Amount	20.5 oz.
Recommended type	Texaco Capella "D"
Refrigerant charge (approx.).	7.5 lbs
Refrigerant type	R-22

(33) *Base plan.* Refer to figure 1–3 for base plan.

(34) *Wiring diagram.* Refer to figure 1–4 for wiring diagram.

Figure 1–4. Wiring diagram.
(Located in back of manual)

Figure 1–4—Continued.
(Located in back of manual)

1–5. Difference in Models

This manual covers only the model CH620–2 air conditioner.

CHAPTER 2

INSTALLATION AND OPERATING INSTRUCTIONS

Section I. SERVICE UPON RECEIPT OF MATERIEL

2–1. Inspecting and Servicing the Equipment

a. Inspect the entire air conditioner for signs of damage, paying particular attention to the evaporator, condenser coils, fan motor and fans.

b. Perform daily preventive maintenance services (table 3–1).

c. Perform quarterly preventive maintenance services (table 3–1).

d. The air conditioner contains a full operating charge of refrigerant and compressor oil. No further service is required.

2–2. Installation of Separately Packed Components

a. General. Although the air conditioner is a self-contained unit, in certain installations it may be desirable to use a sound attenuator and/or remote control operation.

b. Sound Attenuator. The sound attenuator provides a sound dampening effect for the normal sounds the air conditioner emits. It is mounted on the front of the air conditioner (fig. 2–1). The sound attenuator replaces the air intake and discharge grilles. Air is taken in through the bottom baffles and discharged through the top of the attenuator. Refer to figure 2–1 and install the sound attenuator as follows:

(1) Refer to figure 3–4 and remove the intake and discharge grilles.

(2) Place the sound attenuator in position on the front of the air conditioner and aline the grille mounting holes with the attenuator mounting holes.

Note. Ensure notched edge of the attenuator matches the fresh air damper door control chain location.

(3) Install the mounting bolts.

(4) Store grilles in a protected area to avoid possible damage.

c. Blockoff Assembly. The blockoff assembly (fig. 2–2) is provided for installation when the air conditioner control panel is removed for remote control operation. The blockoff assembly must be used to seal the cavity caused by removal of the control panel so that no air will enter the lower compartment. An electrical connector is provided as part of the blockoff assembly for making the remote control connection to the air conditioner. Install the blockoff assembly as follows:

(1) Disconnect electrical power from air conditioner.

(2) Refer to figure 3–4 and remove front access cover.

(3) Refer to figure 3–10 and remove control panel.

(4) Refer to figure 2–2 and install the blockoff assembly.

(5) Reinstall front access cover (fig. 3–4).

2–3. Installation or Setting Up Instructions

a. General. Set air conditioner in a level position to allow proper draining of condensate. (Operation will be satisfactory with unit setting at a slight angle and using one of the alternate drain connections.)

b. Locating the Unit. The front access cover and intake and discharge grilles must be accessible for removal to allow normal service and maintenance. The condenser coil and fan must be unobstructed to allow sufficient airflow for condensing purposes. The intake and discharge openings at the front of the unit should be free of obstruction to permit maximum unit capacity.

c. Duct Installation. Certain types of operation may require the use of air ducts as shown in figure 2–3. In any event, this type of setup must be used when operating with a chemical and biological filter attached to the air conditioner. Install the discharge and return air ducts as follows:

(1) Refer to figure 3–4 and remove the discharge and intake grilles.

(2) Refer to figure 2–3 and install the discharge and return air ducts.

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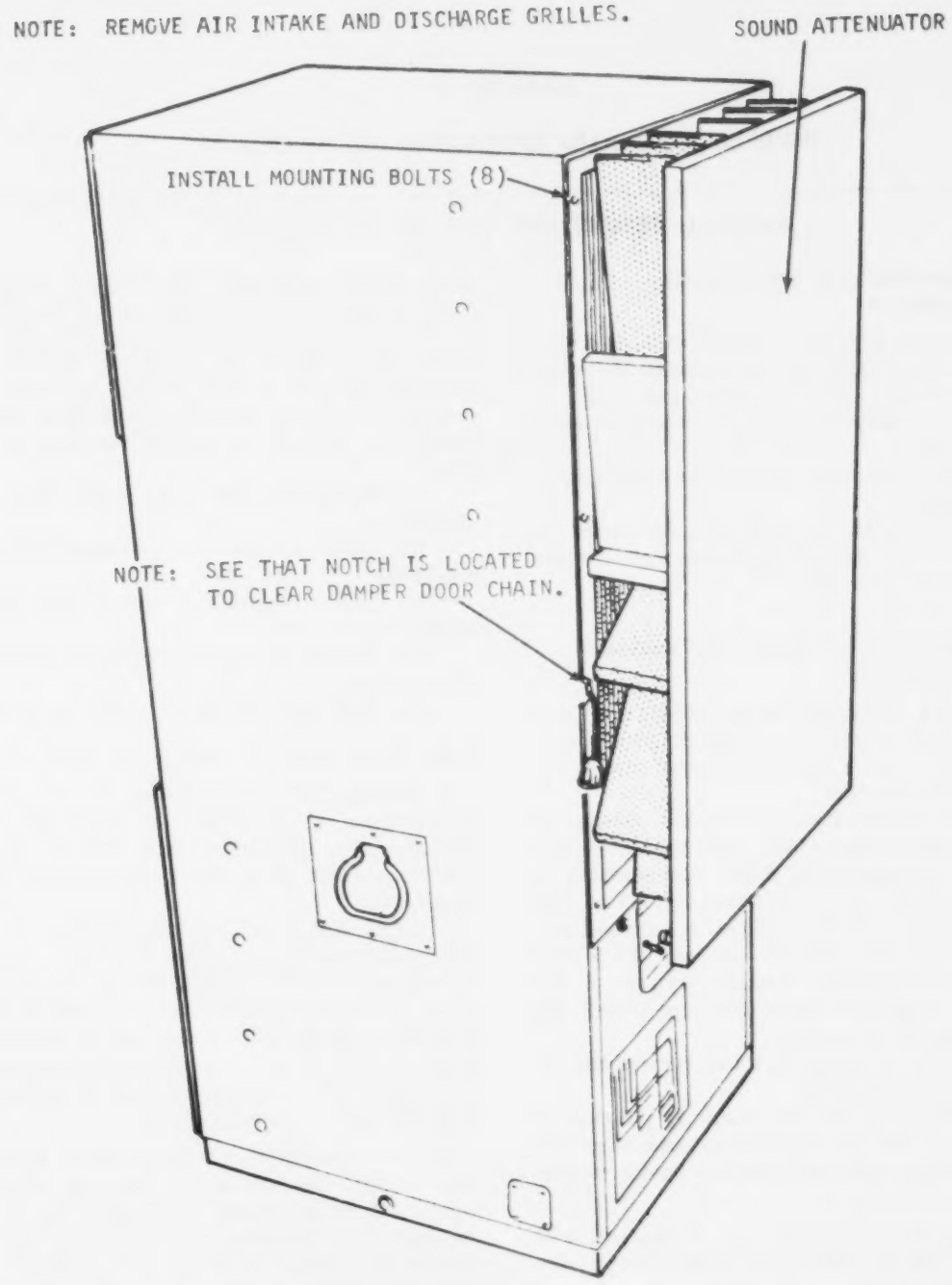

NOTE: REMOVE AIR INTAKE AND DISCHARGE GRILLES.
SOUND ATTENUATOR
INSTALL MOUNTING BOLTS (8)
NOTE: SEE THAT NOTCH IS LOCATED TO CLEAR DAMPER DOOR CHAIN.
ME 4120-308-15/2-1

Figure 2-1. Sound attenuator installation.

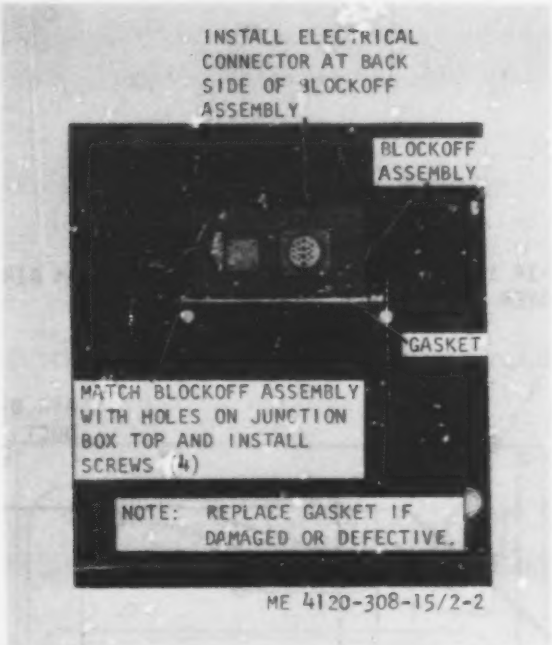

INSTALL ELECTRICAL CONNECTOR AT BACK SIDE OF BLOCKOFF ASSEMBLY
BLOCKOFF ASSEMBLY
GASKET
MATCH BLOCKOFF ASSEMBLY WITH HOLES ON JUNCTION BOX TOP AND INSTALL SCREWS (4)
NOTE: REPLACE GASKET IF DAMAGED OR DEFECTIVE.
ME 4120-308-15/2-2

Figure 2-2. Blockoff assembly installation.

(3) Refer to figure 2-3 and install the discharge and intake grilles to prevent foreign objects from entering ducts.

d. Chemical and Biological Filter Installation. When conditions require operating the air conditioner using a chemical and biological filter, the unit should be prepared for operation as follows:

(1) Refer to figure 2-3 and install the discharge and return air ducts.

(2) Refer to figure 3-6 and remove the CB intake duct cover.

(3) Refer to figure 2-3 and attach duct from a suitable CB filter to CB intake duct.

(4) Close fresh air damper door by pulling damper door control chain. The air conditioner is now ready for CB mode operation.

e. Installing Unit. Bolt unit to floor or other flat surface. Refer to base plan (fig. 1-3) for dimensions. Remove condensate drain plug (fig. 1-2), connect drain hose, if required, to drain connections, or to one of the alternate drain connections. Be sure drain connections not being used are plugged.

f. Power Source. The air conditioner operates on 208 volts, 50/60 Hertz, 3-phase power. The power input receptacle is located at the rear of the unit above the condenser coil inlet. Alternate locations for electrical power connections are provided at both sides of the unit. Any location may be used by interchanging the receptacle at the rear of the unit and one of the cover plates at each side of the unit. Be sure the unused receptacle locations are covered to prevent air from being drawn through the opening.

g. Conversion to Remote Control. The control panel may be removed from the air conditioner to operate the unit by remote control. To relocate the control panel proceed as follows:

(1) Disconnect electrical power from air conditioner.

(2) Refer to paragraph 2-2 and install the blockoff assembly.

(3) Refer to figure 2-4 and install the capillary tube and sensing bulb on rear of control panel.

(4) Refer to figure 2-4 and connect interconnecting cable to connector on blockoff assembly and receptacle on control panel.

Note. Remote control connection can be made as above or by removing the electrical connector from the blockoff assembly and installing it in one of the alternate electrical connection locations shown on figures 1-1 and 1-2.

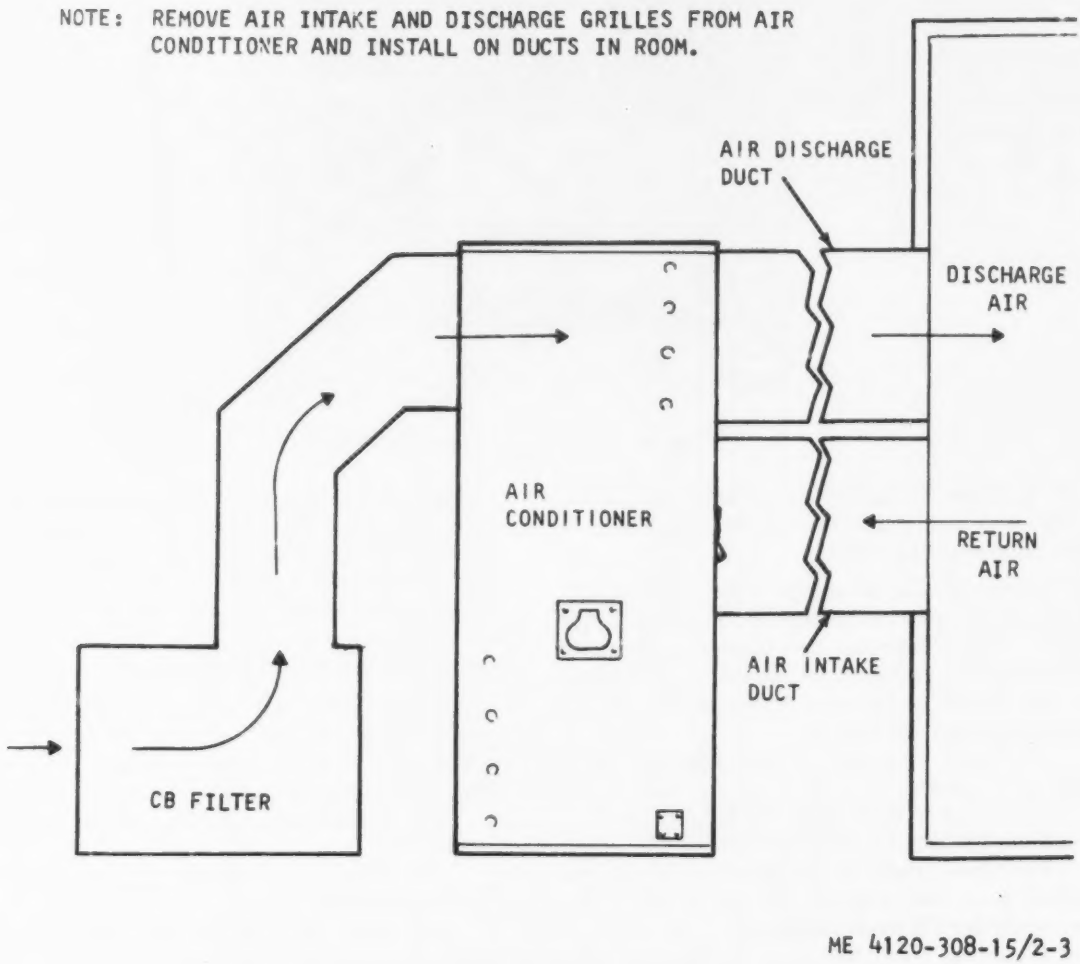

NOTE: REMOVE AIR INTAKE AND DISCHARGE GRILLES FROM AIR CONDITIONER AND INSTALL ON DUCTS IN ROOM.
AIR DISCHARGE DUCT
DISCHARGE AIR
AIR CONDITIONER
RETURN AIR
AIR INTAKE DUCT
CB FILTER
ME 4120-308-15/2-3

Figure 2-3. Duct installation and CB operation.

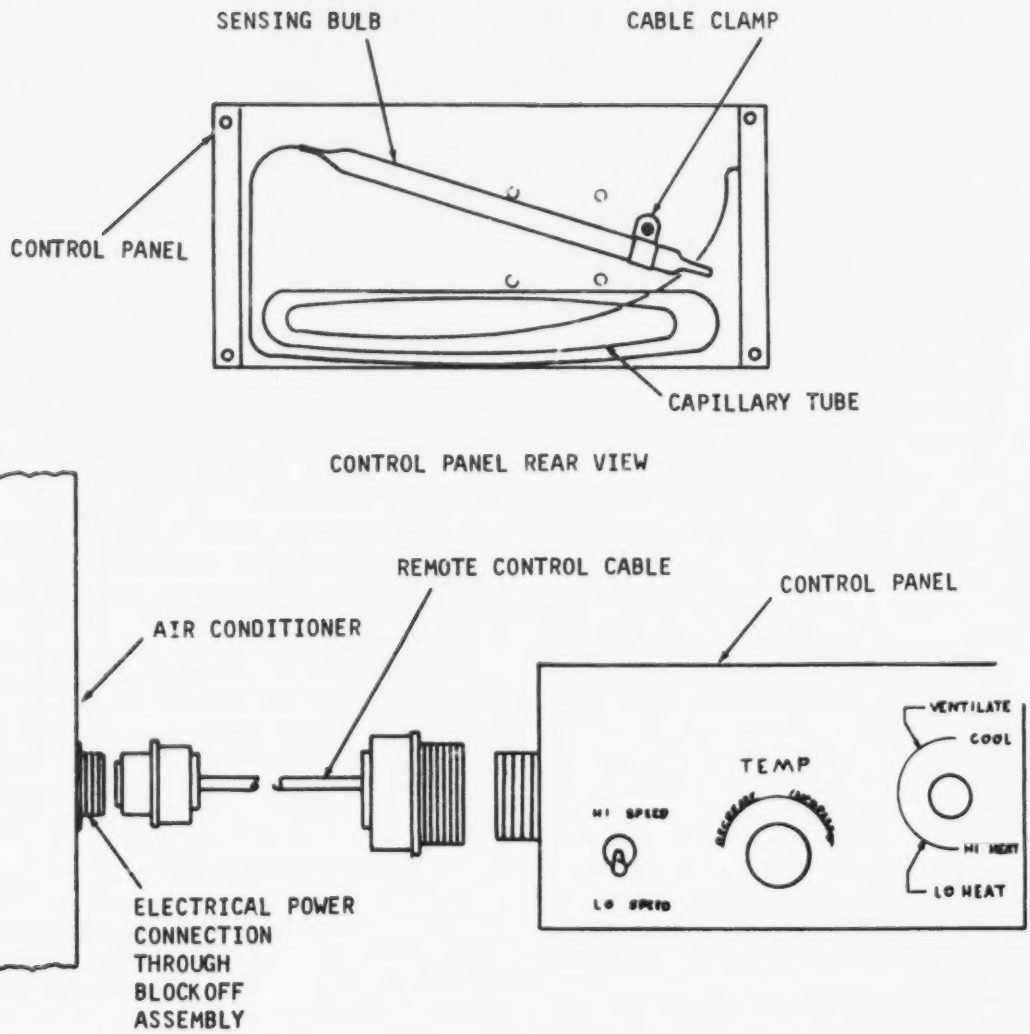


Figure 2-4. Remote control installation.

Section II. MOVEMENT TO A NEW WORKSITE

2–4. Dismantling for Movement

a. General.

(1) Turn off electrical power supply to air conditioner and disconnect power cable from unit.

(2) Disconnect drain hose from unit (if used).

Note. Disconnect duct work, CB filter and remote control cable, if used.

(3) Unbolt unit from mounting surface.

b. Short Distance Movement. Lift unit at base with a forklift or carry unit to new worksite using handles at sides of unit. Keep unit vertical.

c. Long Distance Movement. Crate the air conditioner, providing adequate protection from grilles and control panel. Refer to TM 38–250 for crate fabrication. Provide suitable blocking and tiedowns to prevent unit from shifting during transfer. Keep unit vertical.

2–5. Reinstallation After Movement

Reinstall the air conditioner as instructed in paragraph 2–3.

Section III. CONTROLS AND INSTRUMENTS

2–6. General

This section describes, locates, illustrates, and provides the operator, crew, or organizational maintenance personnel sufficient information about the various controls and instruments to ensure proper operation of the air conditioner. Refer to figure 2–5 for location and operation of controls and instruments.

2–7. Controls and Instruments

a. General. The purpose of the controls and instruments and the normal indication of the instruments are illustrated in figure 2–5.

b. High-Pressure Cutout Switch. The high-pressure cutout switch, located at the top rear of the air conditioner (fig. 2–5B), senses discharge line pressure from the refrigerant compressor and will cut out at 415 (±10) psig. This action stops operation of the compressor and condenser fan motor. When the line pressure has reduced to 400 psi, the high-pressure cutout switch can be reset by pushing the reset button.

c. Low-Pressure Cutout Switch. The low-pressure cutout switch, located at the top rear of the air conditioner (fig. 2–5B), senses suction line pressure to the refrigerant compressor and will cut out at 7 (±5) psig. This action stops operation of the compressor and fan motor. When the line pressure has increased to 12 psi, the low-pressure cutout switch can be reset by pushing the reset button.

d. Liquid Line Sight Glass. The sight glass (fig. 2–2B) gives a visual indication of the dryness of the refrigerant system. Normal indication is green and clear of bubbles. Moisture in the refrigerant system is indicated by the indicator turning from green to chartreuse (caution) to yellow (wet). A shortage of refrigerant in the system is indicated by bubbles in the sight glass.

e. Two-Speed Condenser Fan Selector Switch. The two-speed fan switch (fig. 2–5D) provides the user the option of selecting either HI-SPEED or LO-SPEED air circulation. When the switch is placed in the HI-SPEED position, the fan speed will remain constant until the unit is either shut down or the switch placed in the LO-SPEED position. An increase in compressor discharge pressure to 400 (±16) psig will actuate the normally open pressure switch (S3), causing the switch to close and the fan speed to increase to HI-SPEED. When the discharge pressure drops to 350 (±16) psig, the pressure switch (S3) contacts will return to normally open and the fan speed will return to LO-SPEED.

f. Rotary Selector Switch. The operation of the air conditioner is controlled by the rotary selector switch located on the control panel (fig. 2–5D). It has five positions: HI-HEAT, LO-HEAT, OFF, VENTILATE, and COOL. When the switch is placed in the HI-HEAT position, the fan motor is actuated and all six heater elements are placed in operation. Moving the selector switch to the LO-HEAT position presents the same control sequence but reduces the heating capacity by supplying power to only three heater elements. When the switch is in the OFF position, all circuits beyond the switch are open. The VENTILATE position turns on the fan motor to circulate the air in the conditioned space. In the COOL position, the fan motor and compressor motor are operating to deliver cool air at the selected temperature.

g. Thermostat. The thermostat located on the air conditioner control panel (fig. 2–5D) is manually set to the desired temperature control point in an operating range of 40° F to 90° F. Clockwise rotation calls for warmer air and counterclockwise rotation for cooler air. The selected temperature is automatically maintained within 2 (±1)°F.

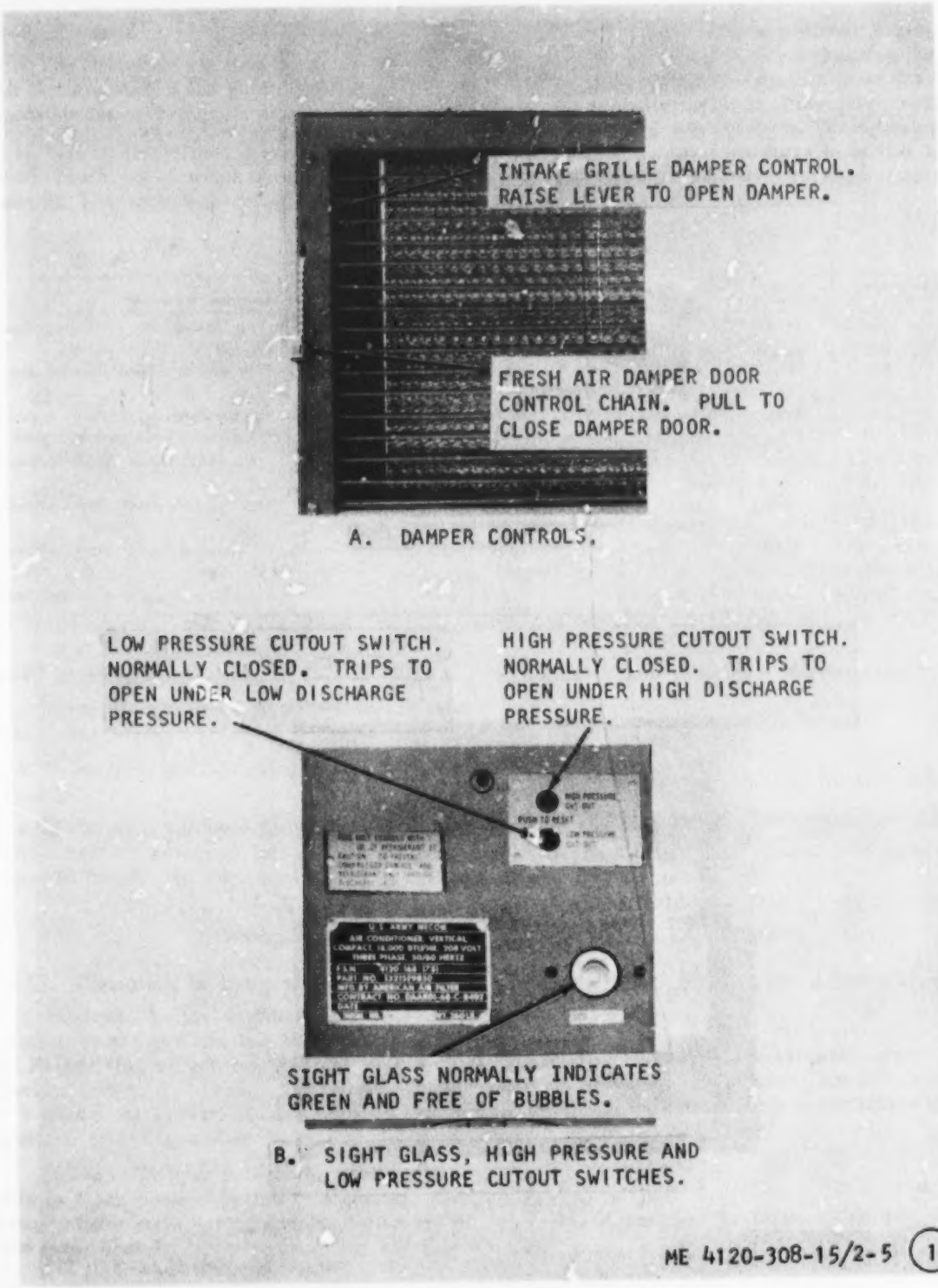
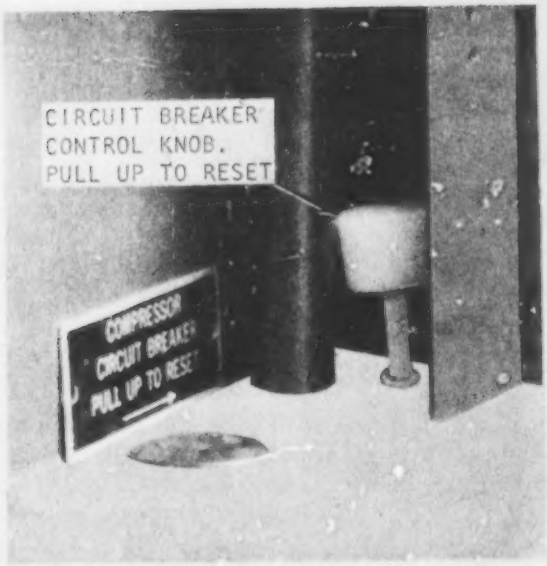
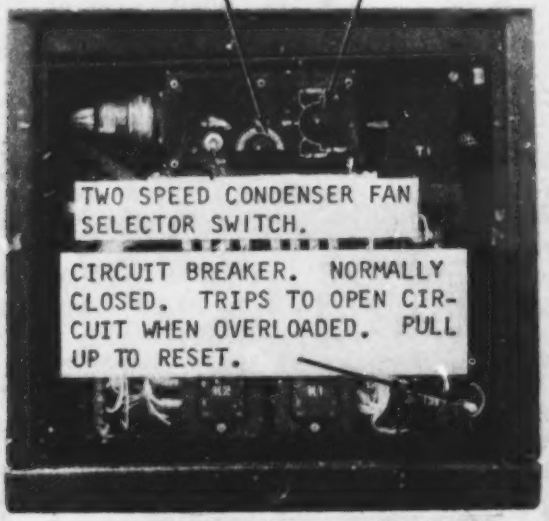

INTAKE GRILLE DAMPER CONTROL. RAISE LEVER TO OPEN DAMPER.
FRESH AIR DAMPER DOOR CONTROL CHAIN. PULL TO CLOSE DAMPER DOOR.
A. DAMPER CONTROLS.
LOW PRESSURE CUTOUT SWITCH. NORMALLY CLOSED. TRIPS TO OPEN UNDER LOW DISCHARGE PRESSURE.
HIGH PRESSURE CUTOUT SWITCH. NORMALLY CLOSED. TRIPS TO OPEN UNDER HIGH DISCHARGE PRESSURE.
SIGHT GLASS NORMALLY INDICATES GREEN AND FREE OF BUBBLES.
B. SIGHT GLASS, HIGH PRESSURE AND LOW PRESSURE CUTOUT SWITCHES.
ME 4120-308-15/2-5 (1)

Figure 2–5. Controls and instruments.



C. CIRCUIT BREAKER CONTROL KNOB.


THERMOSTAT. TURN CLOCKWISE TO INCREASE OR COUNTER-CLOCKWISE TO DECREASE TEMPERATURE.
ROTARY SELECTOR SWITCH NORMALLY POSITIONED FOR REQUIRED TYPE OF AIR CONDITIONING.
TWO SPEED CONDENSER FAN SELECTOR SWITCH.
CIRCUIT BREAKER. NORMALLY CLOSED. TRIPS TO OPEN CIRCUIT WHEN OVERLOADED. PULL UP TO RESET.

D. CIRCUIT BREAKER, THERMOSTAT AND ROTARY SELECTOR SWITCH.

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Figure 2-5—Continued.

Section IV. OPERATION UNDER USUAL CONDITIONS

2–8. General

a. The instructions in this section are published for the information and guidance of personnel responsible for operation of the air conditioner.

b. The operator must know how to perform every operation of which the air conditioner is capable. This section gives instructions on starting and stopping the air conditioner, operation of the air conditioner, and on coordinating the basic motions to perform the specific tasks for which the equipment is designed. Since nearly every job presents a different problem, the operator may have to vary given procedures to fit the individual job. Refer to table 2–1 for general operating control settings.

Table 2–1. Operating Control Settings

Type of air conditioning required	Thermostat setting	Intake air grille dampers	Fresh air damper door	Rotary switch position
Cooling—100% recirculated air	Desired temperature	Open	Closed	COOL
Cooling—with fresh makeup air	Desired temperature	Partially closed*	Open	COOL
Cooling—with fresh makeup air drawn through CB filter (outdoor air contaminated)	Desired temperature	Open	Closed	COOL
Heating—100% recirculated air	Desired temperature	Open	Closed	LO-HEAT or HI-HEAT
Heating—with fresh makeup air	Desired temperature	Partially closed*	Open	LO-HEAT or HI-HEAT
Heating—with fresh makeup air drawn through CB filter (outdoor air contaminated)	Desired temperature	Open	Closed	LO-HEAT or HI-HEAT
Ventilation—maximum outdoor air	Any	Closed	Open	VENTILATE

*Partial closing of the intake air grille dampers causes a greater portion of the total air flow to be drawn from the outside.

2–9. Starting

a. Perform daily preventive maintenance services (table 3–1).

b. Refer to figure 2–6 and start the air conditioner.

c. If the air conditioner fails to start, pull the circuit breaker reset rod, located at the front of the unit behind the inlet grille and filter. Push high-and low-pressure cutout switch reset buttons.

2–10. Stopping

Refer to figure 2–7 and stop the air conditioner.

2–11. Operation of Equipment

Refer to figure 2–8 for instructions on operation of the air conditioner.

Section V. OPERATION UNDER UNUSUAL CONDITIONS

2–12. Operation in Extreme Cold

a. General. The air conditioner is designed to operate at a maximum low temperature of 50° F. Ensure that all controls and dampers are in working order.

b. Electrical System. Make sure the electrical system is free of ice and moisture.

***Caution:* Do not disturb the wiring during cold weather unless absolutely necessary. Cold temperatures make wiring and insulation brittle and easily broken.**

2–13. Operation in Extreme Heat

a. General. The air conditioner is designed to operate satisfactorily at temperatures up to 125° F.

b. Ventilation. Allow sufficient room around air conditioner for adequate air circulation. Do not restrict the flow of air at the intake and discharge openings of the unit.

2–14. Operation in Dusty or Sandy Areas

Clean the condenser coil and evaporator coil weekly or more often if necessary. Clean the mist eliminator, air conditioning filter, fresh air inlet screen, and condenser screen daily.

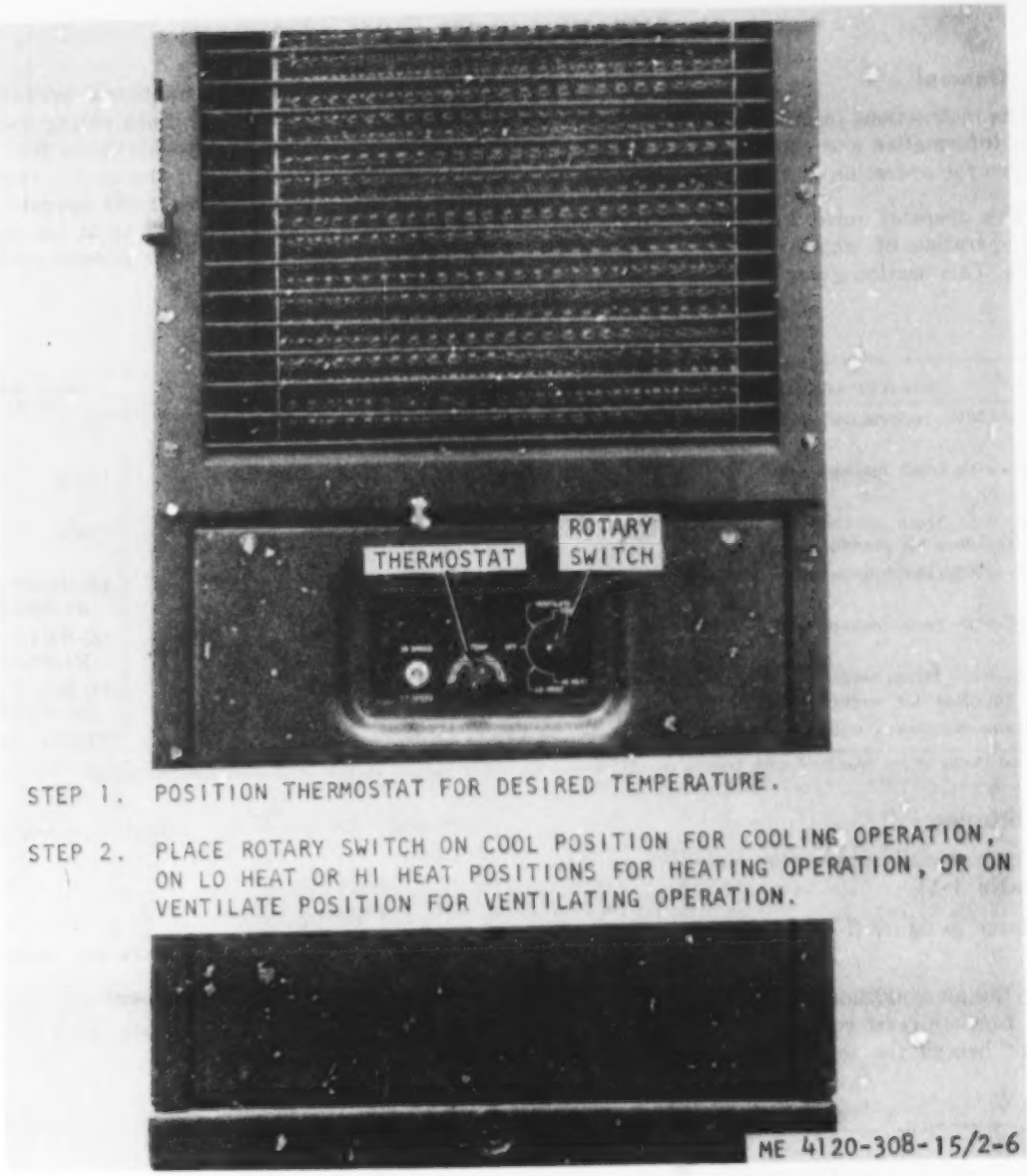

THERMOSTAT
ROTARY SWITCH
STEP 1. POSITION THERMOSTAT FOR DESIRED TEMPERATURE.
STEP 2. PLACE ROTARY SWITCH ON COOL POSITION FOR COOLING OPERATION, ON LO HEAT OR HI HEAT POSITIONS FOR HEATING OPERATION, OR ON VENTILATE POSITION FOR VENTILATING OPERATION.
ME 4120-308-15/2-6

Figure 2–6. Starting instructions.

2–15. Operation Under Rainy or Humid Conditions

If the unit is outside and not operating, protect it with a canvas or waterproof cover. Remove cover during dry periods. Open front access cover to allow unit to dry before operating. Use caution when operating electrical equipment.

2–16. Operation in Salt Water Areas

Wash the exterior of the unit with clean fresh water at frequent intervals. Coat exposed metal surfaces with rust-proofing material. Remove corrosion, and paint exposed metal surfaces. Keep electrical connections dry.

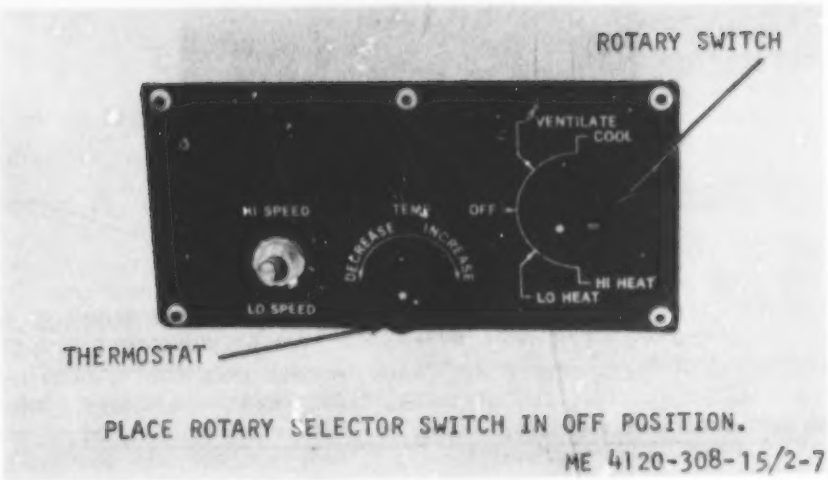
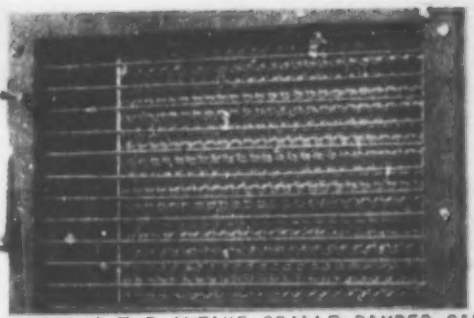
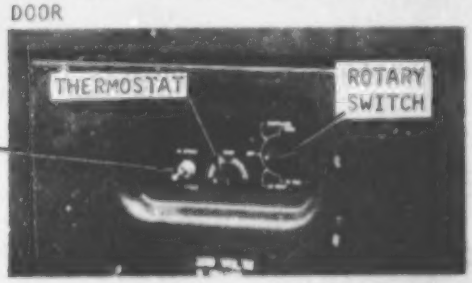


Figure 2-7. Stopping instructions.



NOTE: CLOSING THE INTAKE GRILLE DAMPER CAUSES A GREATER PORTION OF THE TOTAL AIR FLOW TO BE DRAWN FROM THE OUTSIDE THROUGH DAMPER DOOR



A. COOLING OPERATION:
STEP 1. POSITION THERMOSTAT FOR DESIRED TEMPERATURE.
STEP 2. PLACE ROTARY SWITCH ON COOL POSITION.
STEP 3. FOR COOLING WITH 100 PERCENT RECIRCULATED AIR, CLOSE FRESH AIR DAMPER DOOR AND OPEN INTAKE GRILLE DAMPER.
STEP 4. FOR COOLING WITH FRESH MAKEUP AIR, OPEN FRESH AIR DAMPER DOOR AND PARTIALLY CLOSE INTAKE GRILLE DAMPER.
STEP 5. FOR COOLING WITH FRESH MAKEUP AIR DRAWN THROUGH CHEMICAL, BIOLOGICAL, FILTER UNIT WHEN OUTDOOR AIR IS CONTAMINATED. CLOSE FRESH AIR DAMPER DOOR AND OPEN INTAKE GRILLE DAMPER.

B. HEATING OPERATION:
STEP 1. POSITION THERMOSTAT FOR DESIRED TEMPERATURE.
STEP 2. PLACE ROTARY SWITCH ON LO HEAT OR HI HEAT POSITION.
STEP 3. FOR HEATING WITH 100 PERCENT RECIRCULATED AIR, CLOSE FRESH AIR DAMPER DOOR AND OPEN INTAKE GRILLE DAMPER.
STEP 4. FOR HEATING WITH FRESH MAKEUP AIR, OPEN FRESH AIR DAMPER DOOR AND PARTIALLY CLOSE INTAKE GRILLE DAMPER.
STEP 5. FOR HEATING WITH FRESH MAKEUP AIR DRAWN THROUGH CHEMICAL, BIOLOGICAL, FILTER UNIT WHEN OUTDOOR AIR IS CONTAMINATED, CLOSE FRESH AIR DAMPER DOOR AND OPEN INTAKE GRILLE DAMPER.

C. VENTILATING OPERATION:
STEP 1. PLACE ROTARY SWITCH IN VENTILATE POSITION.
STEP 2. FOR VENTILATING OPERATION, OPEN FRESH AIR DAMPER DOOR AND CLOSE INTAKE GRILLE DAMPER.

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Figure 2-8. Operating instructions.

CHAPTER 3

OPERATOR'S AND ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. OPERATOR'S AND ORGANIZATIONAL MAINTENANCE REPAIR PARTS, TOOLS, AND EQUIPMENT

3–1. Tools and Equipment

No special tools or equipment are required by the operator or organizational maintenance personnel.

3–2. Organizational Maintenance Repair Parts

Organizational maintenance repair parts are listed and illustrated in TM 5–420–308–25P (when published).

Section II. LUBRICATION

3–3. Lubrication of the Air Conditioner

No lubrication required.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3–4. General

To insure that the air conditioner is ready for operation at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance checks and services to be performed are listed and described in paragraph 3–5. The item numbers indicate the sequence of minimum inspection requirements. Defects discovered during operation of the unit will be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted which would damage the equipment if operation is continued. All deficiencies and the corrective action taken will be recorded on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

3–5. Preventive Maintenance Checks and Services

Table 3–1 contains a tabulated listing of preventive maintenance services which must be performed by the operator and organizational maintenance personnel at the indicated intervals.

Section IV. OPERATOR'S MAINTENANCE

3–6. Mist Eliminator Service

a. General. The mist eliminator is located under the top access cover between the evaporator air discharge grille and the evaporator coil. It removes moisture from the air that has passed over the evaporator coil, thereby reducing the amount of moisture in the air discharged into the conditioned area.

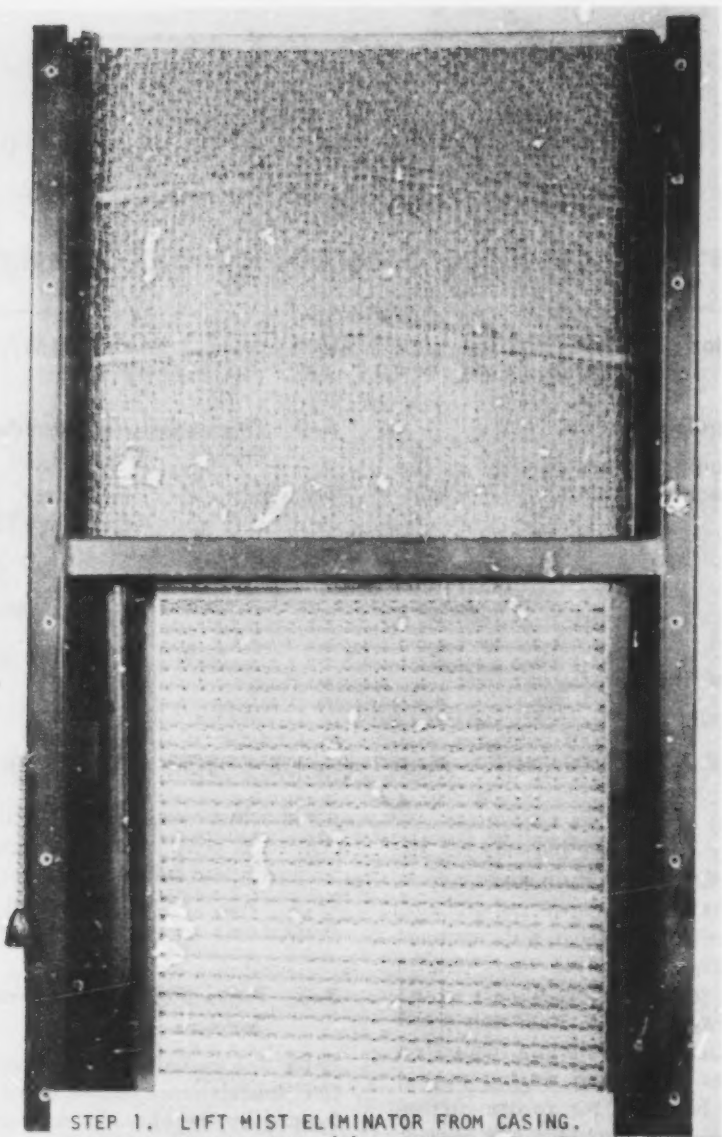
b. Removal. Remove the top access cover and discharge grille (fig. 3–4) and lift out mist eliminator (fig. 3–5).

c. Servicing. Refer to figure 3–1 and service the mist eliminator.

d. Installation. Install in reverse order of removal with drain holes at bottom.

3–7. Air Conditioning Filter Service

a. General. The air conditioning filter is located directly behind the intake grille and in front of the evaporator fan. It prevents the entry of large particles and foreign objects into the evaporator fan area.



STEP 1. LIFT MIST ELIMINATOR FROM CASING.
STEP 2. REMOVE STUD (2), FILTER RETAINER, AND AIR CONDITIONING FILTER.
STEP 3. WASH FILTER AND MIST ELIMINATOR WITH AN APPROVED CLEANING SOLVENT AND DRY WITH CLEAN, LOW-PRESSURE COMPRESSED AIR.
STEP 4. DIP OR SPRAY FILTER WITH FILTER-KOTE OR OIL OF SPECIFICATION MILITARY O-2104 GRADE 20, 30, OR BETTER. DRAIN OFF EXCESS OIL BEFORE INSTALLATION.
STEP 5. REINSTALL AIR FILTER AND MIST ELIMINATOR IN ACCORDANCE WITH STAMPED ARROW DIRECTION. INSURE DRAIN HOLES ARE AT BOTTOM OF MIST ELIMINATOR.

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Figure 3-1. Servicing mist eliminator and air conditioning filter.

b. Removal. Remove the intake grille (fig. 3–4). Refer to figure 3–5 and remove the air conditioning filter.

c. Servicing. Refer to figure 3–1 and service the denser coil grille and screen.

d. Installation. Install the air conditioning filter in reverse order of removal.

3–8. Evaporator and Condenser Coil Service

a. Removal.

(1) Refer to figure 3–6 and remove the condenser coil grille and screne.

(2) Refer to paragraph 3–6 and remove the mist eliminator.

b. Servicing. Refer to figure 3–2 and service the evaporator and condenser coils.

c. Installation. Install the condenser coil grille and screen (para 3–22). Install the mist eliminator (para 3–6).

3–9. Fuse Replacement

a. General. Three fuses are mounted in the upper right corner of the junction box in two separate fuse holders. Fuse holder XF1 contains two 10-ampere fuses and fuse holder XF2 contains one 5-ampere fuse.

b. Removal.

(1) Refer to figure 3–4 and remove the front access cover.

(2) Refer to figure 3–12 and remove the junction box cover.

(3) Refer to figure 3–13 and remove fuses.

(4) Test fuse for continuity with multimeter.

c. Installation.

(1) Refer to figure 3–13 and install two 10-ampere fuses (XF1) and one 5-ampere fuse (XF2).

(2) Install junction box cover (fig. 3–12).

(3) Install front access cover (fig. 3–4).

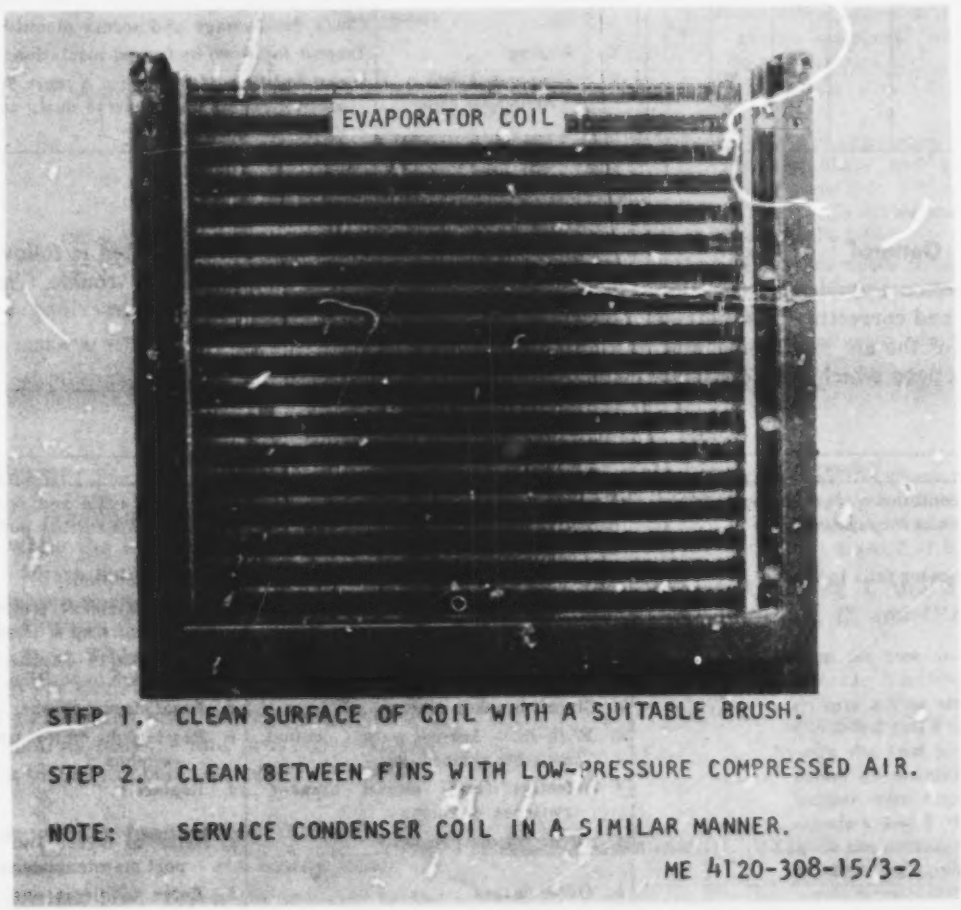

EVAPORATOR COIL
STEP 1. CLEAN SURFACE OF COIL WITH A SUITABLE BRUSH.
STEP 2. CLEAN BETWEEN FINS WITH LOW-PRESSURE COMPRESSED AIR.
NOTE: SERVICE CONDENSER COIL IN A SIMILAR MANNER.
ME 4120-308-15/3-2

Figure 3–2. Servicing evaporator and condenser coils.

Table 3-1. Preventive Maintenance Checks and Services

Item number	Interval						B—Before operation D—During operation	A—After operation W—Weekly	M—Monthly Q—Quarterly
	Operator				Org.				
	Daily				M	Q	Item to be inspected	Procedure	Reference
	B	D	A	W					
1				X		X	Mist eliminator	Wash and dry mist eliminator. May require a more frequent cleaning under severe dusty conditions.	Para 3-6
2				X		X	Air filter	Clean air conditioner filter and reapply filter coating. May require a more frequent cleaning under severe dusty conditions. Replace damaged filter. Tighten lose mounting.	Para 3-7
3				X			Condenser screen	Clean condenser screen.	Para 3-8
4			X			X	Sight glass	Inspect sight glass for indication of moisture. During cooling mode of operation, with temperature control thermostat in the maximum decrease position, check sight glass for bubbles or cloudiness, which may indicate low refrigerant level.	Para 2-7
5			X			X	Controls	Check for proper operation.	Para 2-7
6			X			X	Fan	Listen for any unusual noise or vibration. Check for damage and secure mounting.	
7						X	Wiring	Inspect for worn or frayed insulation.	
8						X	Evaporator and condensor coils	Clean coil fins. May require a more frequent cleaning under severe dusty conditions.	Para 3-8

Section V. TROUBLESHOOTING

3-10. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the air conditioner and its components. Malfunctions which may occur are listed in table 3-2. Each malfunction stated is followed by a list of probable causes of the trouble. The corrective action recommended is described opposite the probable cause.

Table 3-2. Troubleshooting

Malfunction	Probable cause	Corrective action
1. Air conditioner fails to operate (all circuits inoperative).	Facility power cable not connected or defective and/or an inoperative facility power source.	Check out cable and replace if defective. Check facility power is on.
2. Compressor fails to start.	a. Power line failure	a. Restore power.
	b. Ambient temperature below 0° F.	b. Check ambient temperature. Proceed to step c, if temperature is above 0° F.
	c. Selector switch set improperly.	c. Set switch to position.
	d. Circuit breaker open.	d. Reset circuit breaker.
	e. High-or low-pressure cutout switches tripped.	e. Reset high- or low-pressure cutout switches.
	f. Defective fuses, circuit breaker, switches, or relays.	f. Replace.
	g. Defective compressor.	g. Refer to direct and general support maintenance personnel.
	h. Other causes.	h. Refer to direct and general support maintenance personnel.
3. Compressor shuts down during operation.	a. Intake grille closed or obstructed.	a. Remove obstruction or open intake grille dampers.

Table 3–2—Continued

Malfunction	Probable cause	Corrective action
	b. Discharge grille obstructed.	*b.* Remove obstruction.
	c. Air filter clogged or obstructed.	*c.* Remove obstruction or service air filter (para 3–7).
	d. Mist eliminator clogged.	*d.* Service mist eliminator (para 3–6).
	e. Evaporator coil clogged.	*e.* Service evaporator coil (para 3–8).
	f. Fan motor defective.	*f.* Replace motor (para 3–36).
	g. Other causes.	*g.* Refer other causes to direct and general support maintenance personnel.
4. Insufficient or no cooling.	*a.* Refrigerant compressor not operating or fails to start.	*a.* Refer to malfunction No. 2 and 3.
	b. Thermostat and/or rotary selector switch improperly set.	*b.* Reset controls (para 2–8).
	c. Air filter clogged or obstructed.	*c.* Remove obstruction or service air filter (para 3–7).
	d. Improperly adjusted or closed intake grille dampers or fresh air and CB intakes.	*d.* Adjust grille blades and damper doors (para 2–8).
	e. Other causes.	*e.* Refer other causes to direct and general support maintenance personnel.
5. Insufficient or no heating capacity.	*a.* Thermostat and/or rotary selector switch improperly set.	*a.* Reset controls (para 2–8).
	b. Air movement over evaporator insufficient.	*b.* Service mist eliminator, air conditioning filter, and evaporator coil (para 3–6, 3–7 and 3–8). Adjust grille blades and damper doors (para 2–8).
	c. Other causes.	*c.* Refer other causes to direct and general support maintenance personnel.
6. Sight glass indicates yellow.	Moisture in system	Report malfunction to direct support maintenance.

Section VI. FIELD EXPEDIENT REPAIRS

3–11. General

Operator and organizational maintenance trouble may occur while the air conditioner is operating in the field where supplies and repair parts are not available and normal corrective action cannot be performed. When this condition exists, the following expedient repairs may be used in emergencies upon the decision of the unit commander. Equipment so repaired must be removed from operation as soon as possible and properly repaired before being placed in operation again.

3–12. Compressor Inoperative

Trouble	*Field expedient remedy*
Compressor overload protector (S5).	Bypass the protector by installing a jumper wire across terminals 3 and 5 of TB–2.
Phase sequence relay (K6)	Bypass the phase sequence relay by installing a jumper wire across terminals 2 and 3 of K6.

Warning: **Prior to jumping 2 and 3 of K6, ensure correct phasing at A, B, and C of P4.**

Fuse holder (XF)	Bypass the fuse and fuse holder by installing a jumper wire across terminals 1 and 2 or 3 and 4 of XF1.
Fuse holder (XF2)	Bypass the fuse and fuseholder by installing a jumper wire across terminals 1 and 2 of XF2.
Pressure switch (S3)	Bypass the pressure switch by installing a jumper wire across terminals 1 and 2 of S3.
Compressor circuit breaker (CB1).	Bypass the compressor circuit breaker by installing a

	jumper wire across terminals A1 and A2, B1 and B2, C1 and C2, and N0 and C of CB1.
Compressor start relay (K1)	Bypass the start relay by installing a jumper wire across terminals A1 and A2, B1 and B2, and C1 and C2 of K1.

Warning: **Do not jumper X1 and X2 of K1.**

Time delay relay (K3)	Bypass the time delay relay by installing a jumper wire across terminals 5 and 7 of K3.
High-pressure cutout switch (S6).	Bypass the high-pressure cutout switch by installing a jumper wire across terminals 1 and 5 of TB2.
Low-pressure cutout switch (S7).	Bypass the low-pressure cutout switch by installing a jumper wire across terminals 1 and 5 of TB2.

3–13. Fan Motor Inoperative

Trouble	*Field expedient remedy*
Fan motor switch (S8)	Bypass the fan motor switch by installing a jumper wire across terminals 1 and 2 of S8.

3–14. Heaters Inoperative

Trouble	*Field expedient remedy*
Heater relay (K2)	Bypass the heater relay by installing a jumper wire across terminals A1 and A2, B1 and B2, and C1 and C2 of K2.

Warning: **Do not jumper X1 and X2 of K2.**

High temperature cutout switch (S4).	Bypass the heater cutout switch by unwiring terminals 4, 5, and 6, and tieing the wires together.

Warning: **Do not attempt to jump the transformer (T1) or semi-conductor device rectifier (CR1).**

SECTION VII. RADIO INTERFERENCE SUPPRESSION

3–15. Definitions

a. Interference. The term "interference" as used herein applies to electrical disturbances in the radio frequency range which are generated by the air conditioner and which may interfere with the proper operation of radio receivers or other electronic equipment, or enable the enemy to locate the equipment.

b. Interference Suppression. The term "interference suppression" as used herein applies to the methods used to eliminate or effectively reduce radio interference generated by the air conditioner.

3–16. General Methods Used to Attain Proper Suppression

Essentially, suppression is attained by providing a low resistance path to ground for the stray currents. The methods used include shielding the high-frequency wires, grounding the frame with bonding straps, and using capacitors and resistors

3–17. Interference Suppression Components

The primary suppression components are those whose primary function is to suppress radio interference. These components are described and located in figure 3–3.

3–18. Replacement of Suppression Components

Refer to figure 3–3 and replace the radio interference suppression components.

3–19. Testing of Radio Interference Suppression Components

Test the capacitors for leaks and shorts on a capacitor tester; replace defective capacitors. If test equipment is not available and interference is indicated, isolate the cause of interference by the trial-and-error method of replacing each capacitor in turn until the cause of interference is located and eliminated.

Section VIII. ORGANIZATIONAL MAINTENANCE PROCEDURES

3–20. Discharge Grille, Intake Grille, Front Access Cover, and Top Access Cover

a. General. The air conditioner is constructed with removable aluminum covers. The front access cover provides access to the junction box and control panel. The discharge grille protects the

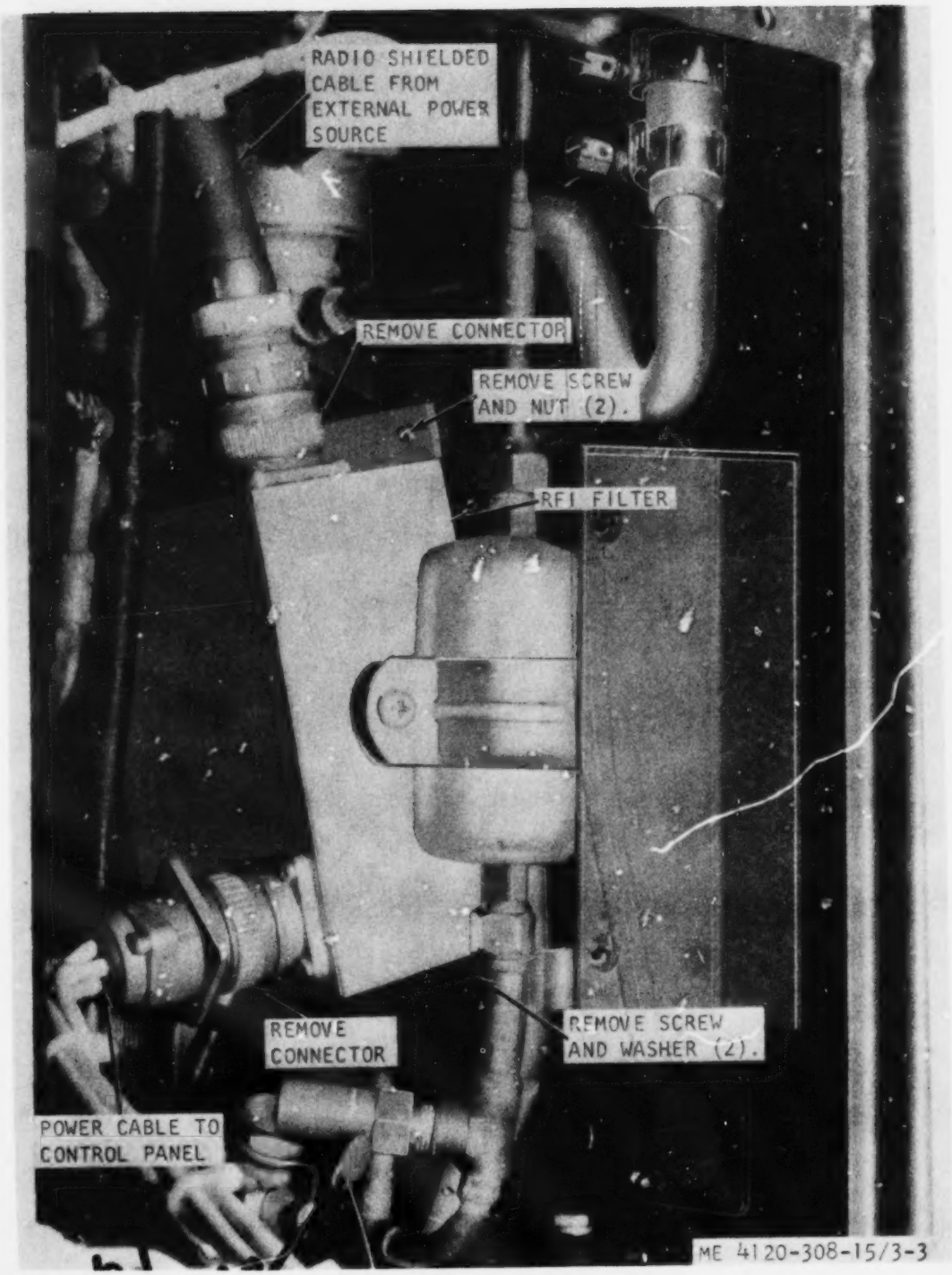


Figure 3-3. Radio interference suppression components.

evaporator coil and mist eliminator and controls the discharge of conditioned air. The intake grille protects the air conditioning filter and regulates the amount of air returned to the unit. The top access cover provides access to the heater elements, regulating valve, expansion valves, PE solenoid valve, high temperature cutout switch, and high- and low-pressure cutout switches.

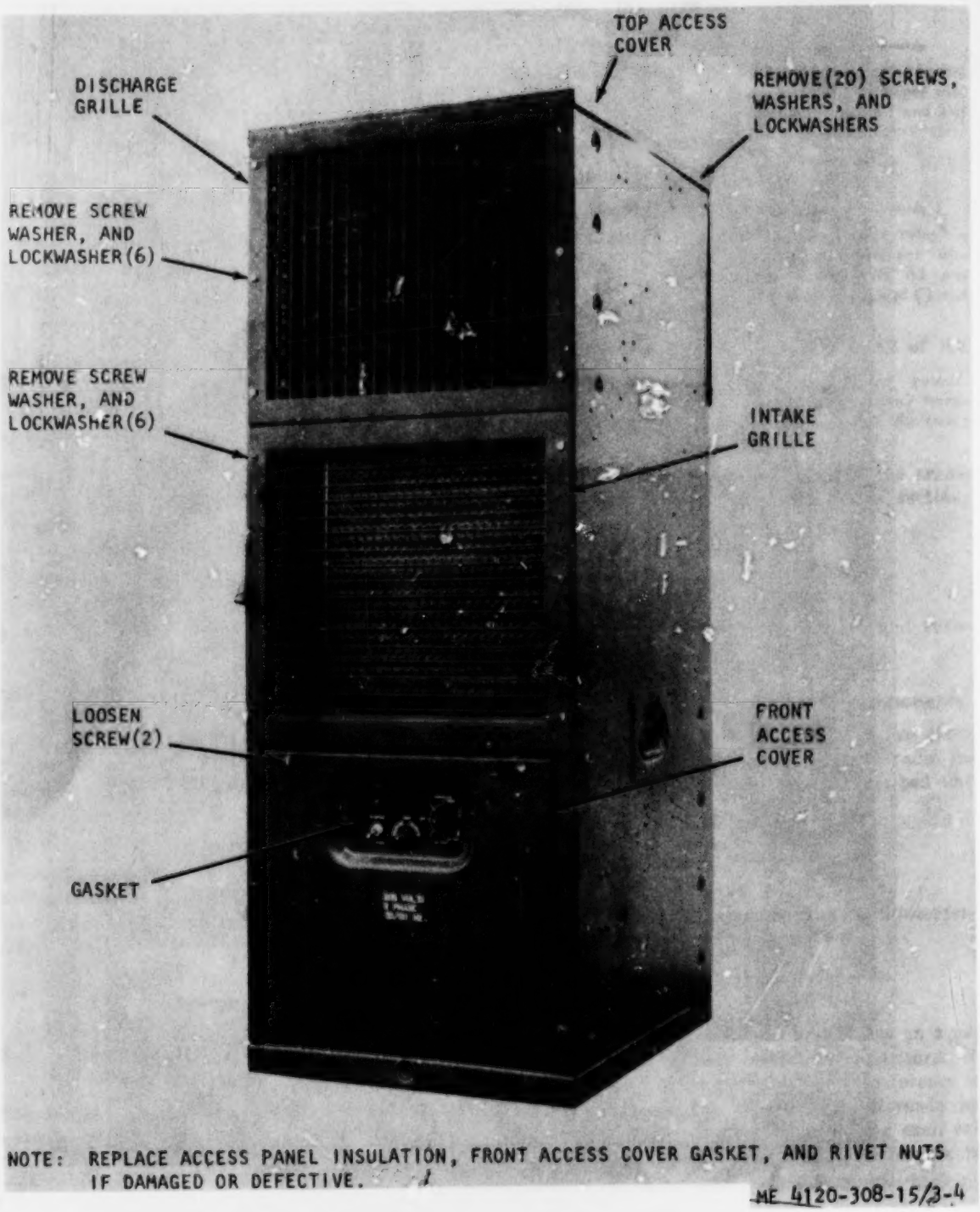

TOP ACCESS COVER
DISCHARGE GRILLE
REMOVE(20) SCREWS, WASHERS, AND LOCKWASHERS
REMOVE SCREW WASHER, AND LOCKWASHER(6)
REMOVE SCREW WASHER, AND LOCKWASHER(6)
INTAKE GRILLE
LOOSEN SCREW(2)
FRONT ACCESS COVER
GASKET
NOTE: REPLACE ACCESS PANEL INSULATION, FRONT ACCESS COVER GASKET, AND RIVET NUTS IF DAMAGED OR DEFECTIVE.
ME 4120-308-15/3-4

Figure 3–4. Discharge grills, intake grille, and front and top access covers, removal and installation.

b. Removal. Refer to figure 3–4 and remove the discharge grille, intake grille, front and top access covers.

c. Installation. Install the discharge grille, intake grille, and front and top access covers in reverse order of removal.

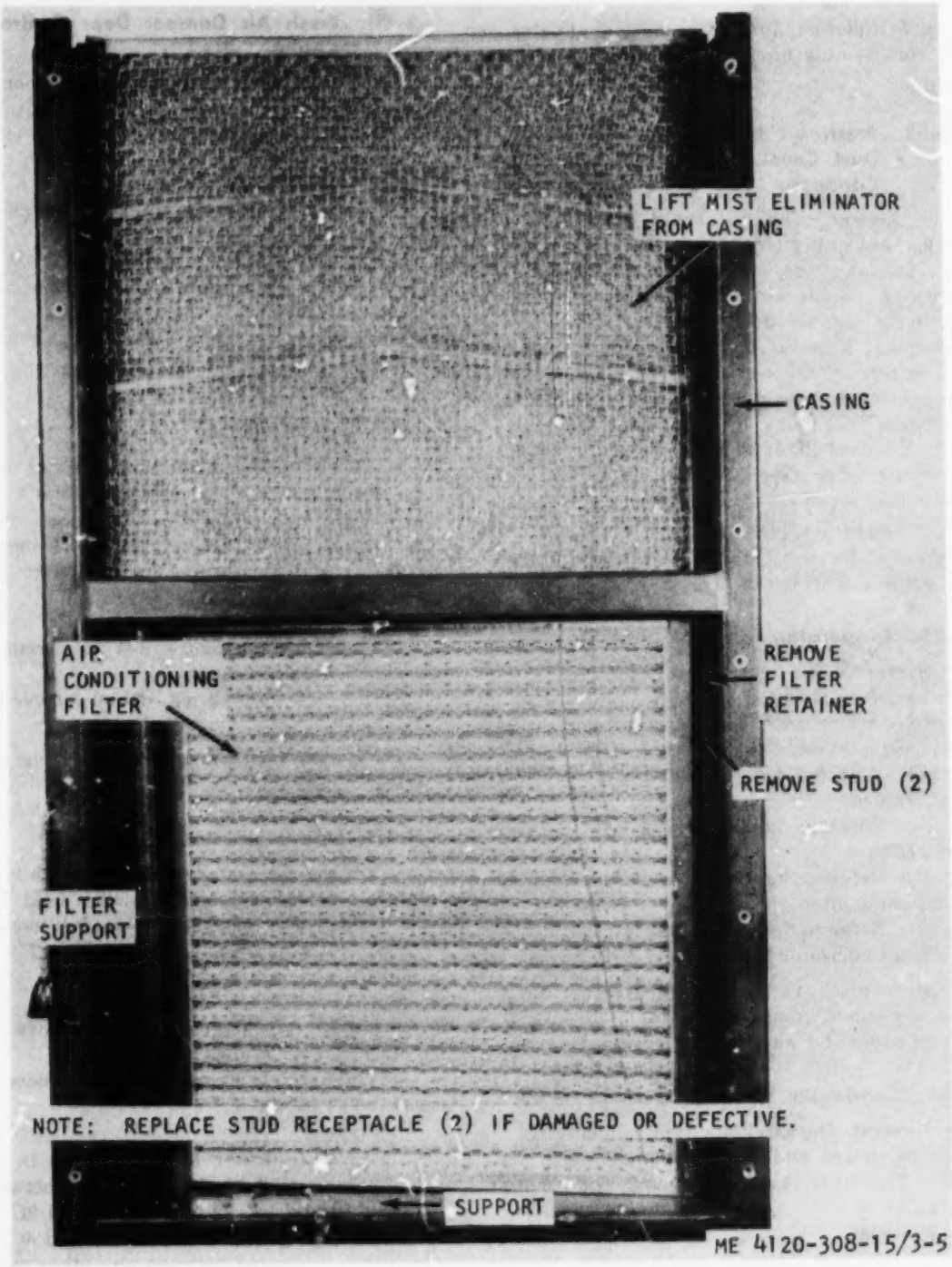


Figure 3–5. Mist eliminator and air conditioning filter, removal and installation.

3–21. Mist Eliminator and Air Conditioning Filter

a. General. The mist eliminator removes moisture from the air that has passed over the evaporator coil, thereby reducing the amount of moisture in the air discharged into the conditioned area. The air conditioning filter prevents the entry of large particles and foreign objects into the evaporator fan area.

b. Removal. Refer to figure 3-5 and remove the mist eliminator and air conditioning filter.

c. Installation. Install the mist eliminator and air conditioning filter in reverse order of removal.

3–22. Fresh Air Inlet Screen, CB Intake Duct Cover, Fan Guard, and Condenser Coil Grille and Screen

a. General. The condenser coil grille and screen, and fan guard protect the condenser coil and fan. A fresh air inlet screen permits the entry of outside air which is controlled by the fresh air damper door with the control spring and chain. Removal of the screen provides access to the refrigerant service valves. The CB intake duct cover provides for attachment of a chemical, biological filter unit.

b. Removal. Refer to figure 3–6 and remove the fresh air inlet screen, intake cover, fan guard, and condenser coil grille and screen.

c. Installation. Install the fresh air inlet screen, intake cover, fan guard, and condenser coil grille and screen in reverse order of removal.

3–23. Evaporator Fan and Inlet Ring

a. General. The centrifugal impeller-type evaporator fan is mounted on one end of a double extended shaft motor. The other shaft end mounts the condenser fan. The inlet ring serves to direct the flow of air and reduce fan noise.

b. Removal.

(1) Refer to figure 3–4 and remove the intake grille.

(2) Refer to figure 3–5 and remove the air conditioning filter.

(3) Refer to figure 3–7 and remove the inlet ring and evaporator fan.

c. Installation. Install the evaporator fan, inlet ring, air conditioning filter, and intake grille in reverse order of removal.

3–24. Condenser Fan

a. General. The axial flow-type condenser fan is mounted on one end of a double extended shaft motor. The other shaft end mounts the evaporator fan.

b. Removal.

(1) Refer to figure 3–6 and remove the fan guard.

(2) Refer to figure 3–8 and remove the condenser fan.

c. Installation. Install the condenser fan and fan guard in reverse order of removal.

3–25. Fresh Air Damper Door Control Chain

a. General. The fresh air damper door control chain controls a damper door to permit drawing in fresh makeup air when operating in either the cooling or heating mode. Pull chain to open damper and release to close.

b. Inspect. Inspect for broken chain and repair as necessary.

c. Repair.

(1) Refer to figure 3–4 and remove intake grille if required.

(2) Refer to figure 3–9 and repair or replace chain.

3–26. Control Panel

a. General. The control panel, located on top of the junction box, houses the rotary selector switch, thermostat, and a two-speed condenser fan switch. In certain applications the control panel may be remotely located. Refer to paragraphs 2–2 and 2–3.

b. Removal.

(1) Refer to figure 3–4 and remove the lower front access cover.

(2) Refer to figure 3–10 and remove the control panel.

c. Installation. Installation is the reverse of removal.

3–27. Rotary Selector Switch

a. General. The rotary selector switch is a manually operated, five-position switch used to select the operating mode. The operating modes are: COOL, VENTILATE, OFF, LO-HEAT and HI-HEAT.

b. Removal.

(1) Refer to figure 3–10 and remove the control panel.

(2) Refer to figure 3–11 and remove the rotary selector switch.

c. Testing.

(1) With power off and switch in the Hi-Heat position, check for continuity between terminals 12 and 1A, 22 and 2B, 21 and 2C, 32 and 3A, 31 and 3C, 42 and 4A, and 41 and 4C. If continuity is indicated between any other terminals, or if continuity is not indicated between the above mentioned terminals, switch is defective and must be replaced.

(2) With power off and switch in LO-HEAT position, check for continuity between terminals

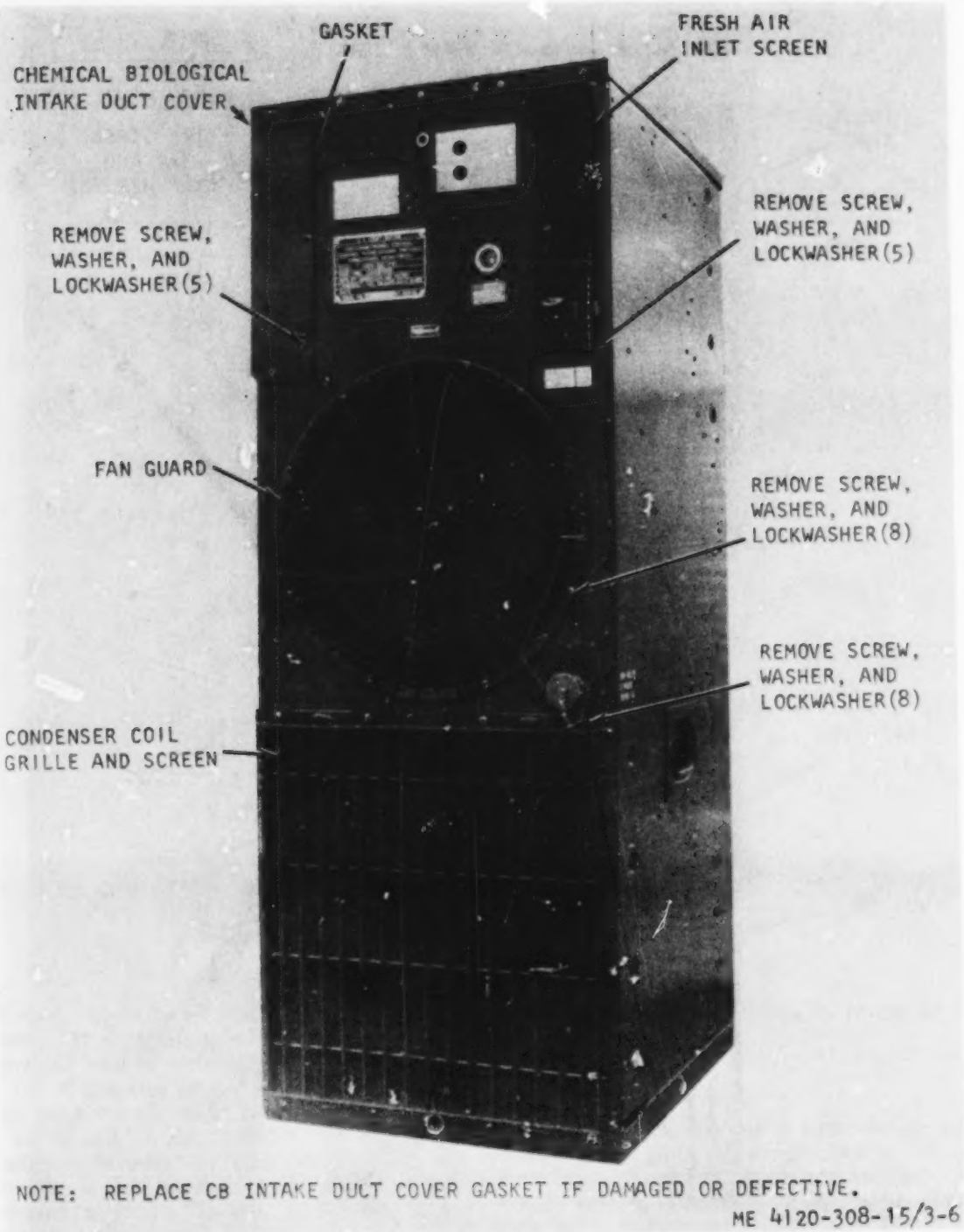

GASKET
FRESH AIR INLET SCREEN
CHEMICAL BIOLOGICAL INTAKE DUCT COVER
REMOVE SCREW, WASHER, AND LOCKWASHER(5)
REMOVE SCREW, WASHER, AND LOCKWASHER(5)
FAN GUARD
REMOVE SCREW, WASHER, AND LOCKWASHER(8)
REMOVE SCREW, WASHER, AND LOCKWASHER(8)
CONDENSER COIL GRILLE AND SCREEN
NOTE: REPLACE CB INTAKE DUCT COVER GASKET IF DAMAGED OR DEFECTIVE.
ME 4120-308-15/3-6

Figure 3–6. Fresh air inlet screen, intake cover, fan guard, and condenser coil grille and screen, removal and installation.

12 and 1A, 22 and 2B, 21 and 2C, and 31 and 3C. If continuity is indicated between any other terminals, or if continuity is not indicated between the above mentoned terminals, switch is defective and must be replaced.

(3) With power off and switch in OFF posi-

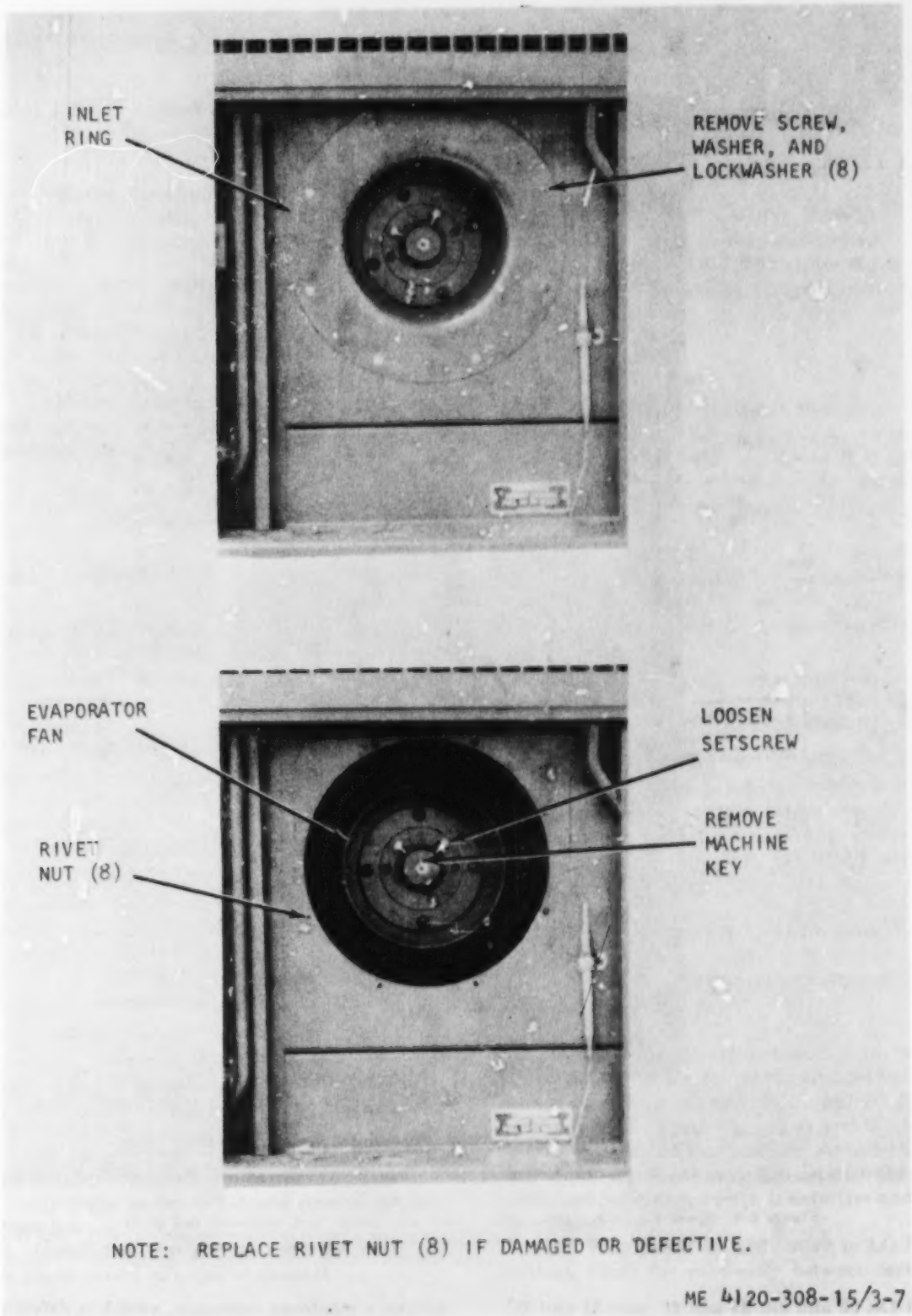


Figure 3–7. Evaporator fan and inlet ring, removal and installation.

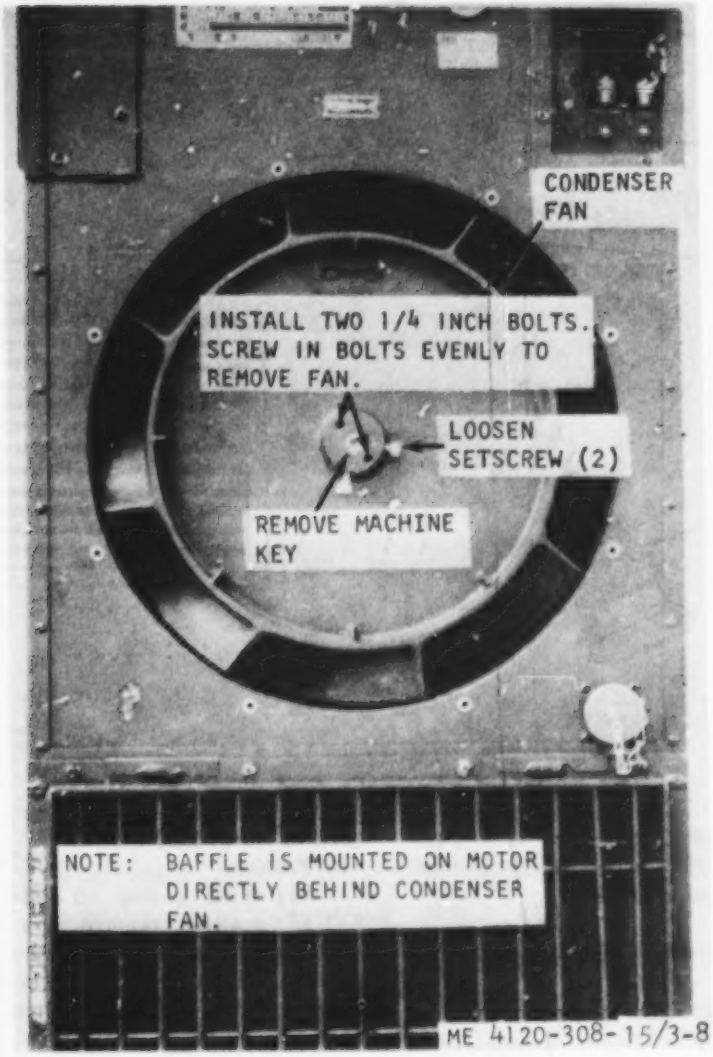

CONDENSER FAN
INSTALL TWO 1/4 INCH BOLTS. SCREW IN BOLTS EVENLY TO REMOVE FAN.
LOOSEN SETSCREW (2)
REMOVE MACHINE KEY
NOTE: BAFFLE IS MOUNTED ON MOTOR DIRECTLY BEHIND CONDENSER FAN.
ME 4120-308-15/3-8

Figure 3–8. Condenser fan, removal and installation.

tion, there should be no continuity between any terminals. If continuity is indicated, switch is defective and must be replaced.

(4) With power off and switch in VENT position, check for continuity between terminals 22 and 2B, 21 and 2C, and 31 and 3C. If continuity is indicated between any other terminals, or if continuity is not indicated between the above mentioned terminals, switch is defective and must be replaced.

(5) With power off and switch in COOL position, check for continuity between terminals 12 and 1B, 11 and 1D, 22 and 2B, 21 and 2C, and 31 and 3C. If continuity is indicated between any other terminals, or if continuity is not indicated between the above mentioned terminals, switch is defective and must be replaced.

d. Installation. Installation is the reverse of removal.

3–28. Thermostat

a. General. The thermostat automatically controls the heating and cooling cycles of the air conditioner. Turn clockwise to increase and counterclockwise to decrease discharge air temperature.

b. Testing.

(1) With power and thermostat in maximum DECREASE position, check for continuity between terminals 1 and 2. Continuity should not be indicated. If continuity is indicated, thermostat is defective and must be replaced.

(2) With power off and thermostat in maxi-

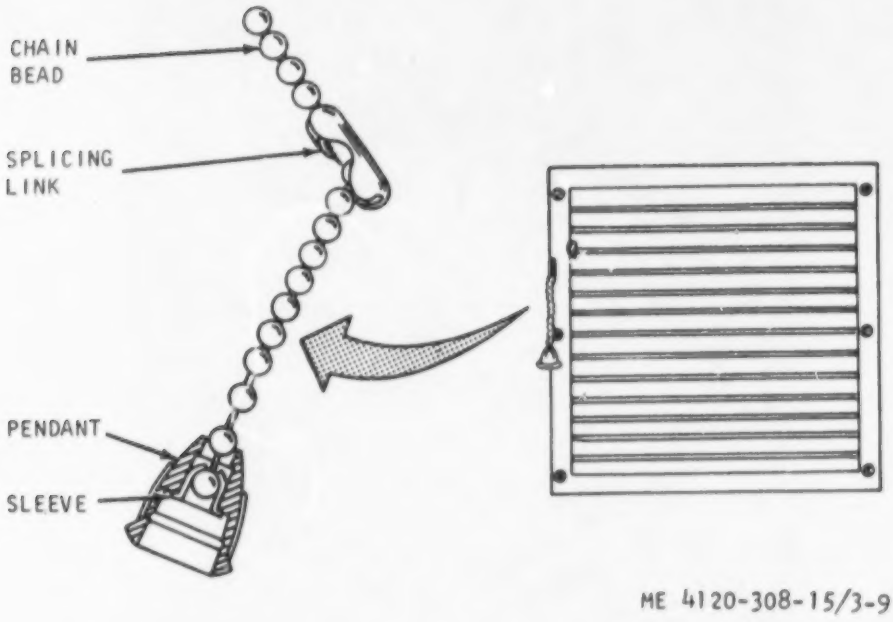


Figure 3–9. Fresh air damper door control chain.

mum INCREASE position, check for continuity between terminals 1 and 2. Continuity should be indicated. If no continuity is indicated, thermostat is defective and must be replaced.

c. Removal.

(1) Refer to paragraph 3–26 and remove the control panel.

(2) Refer to figure 3–11 and remove the thermostat.

d. Installation. Installation is the reverse of removal.

3–29. Two-Speed Condenser Fan Selector Switch.

a. General. The two-speed switch provides the user the option of selecting either HI-SPEED or LO-SPEED air circulation. When the switch is placed in the HI-SPEED position, the fan speed will remain constant until the unit is either shut down or the switch is placed in the LO-SPEED position. When the air conditioner is operated with the fan switch in the LO-SPEED position, an increase in compressor discharge pressure to 400 (±16) psig will actuate the normally open pressure switch (S3), causing the switch to close and the fan speed to increase to HI-SPEED. When the discharge pressure drops to 350 (±16) psig, the pressure switch (S3) contacts will return to normally open and the fan speed will return to LO-SPEED.

b. Testing.

(1) With power off and switch in HI-SPEED position, remove wire No. V3C16 from (fig. 1–4①) and check continuity between it and X2 of K5. Continuity should be indicated. If continuity is not indicated, switch is defective and must be replaced.

(2) With power off and switch in LO-SPEED position, remove wire No. V3C16 from XF2 (fig. 1–4 ①) and check for no continuity between it and X2 of K5. Continuity should not be indicated. If continuity is indicated, switch is defective and must be replaced.

c. Removal.

(1) Refer to paragraph 3–26 and remove the control panel.

(2) Refer to figure 3–11 and remove the fan switch.

d. Installation. Installation is the reverse of removal.

3–30. Junction Box

a. General. The junction box is located at the bottom front of the air conditioner. Access is gained by removing the front access cover. The junction box houses the phase sequence relay, ar-

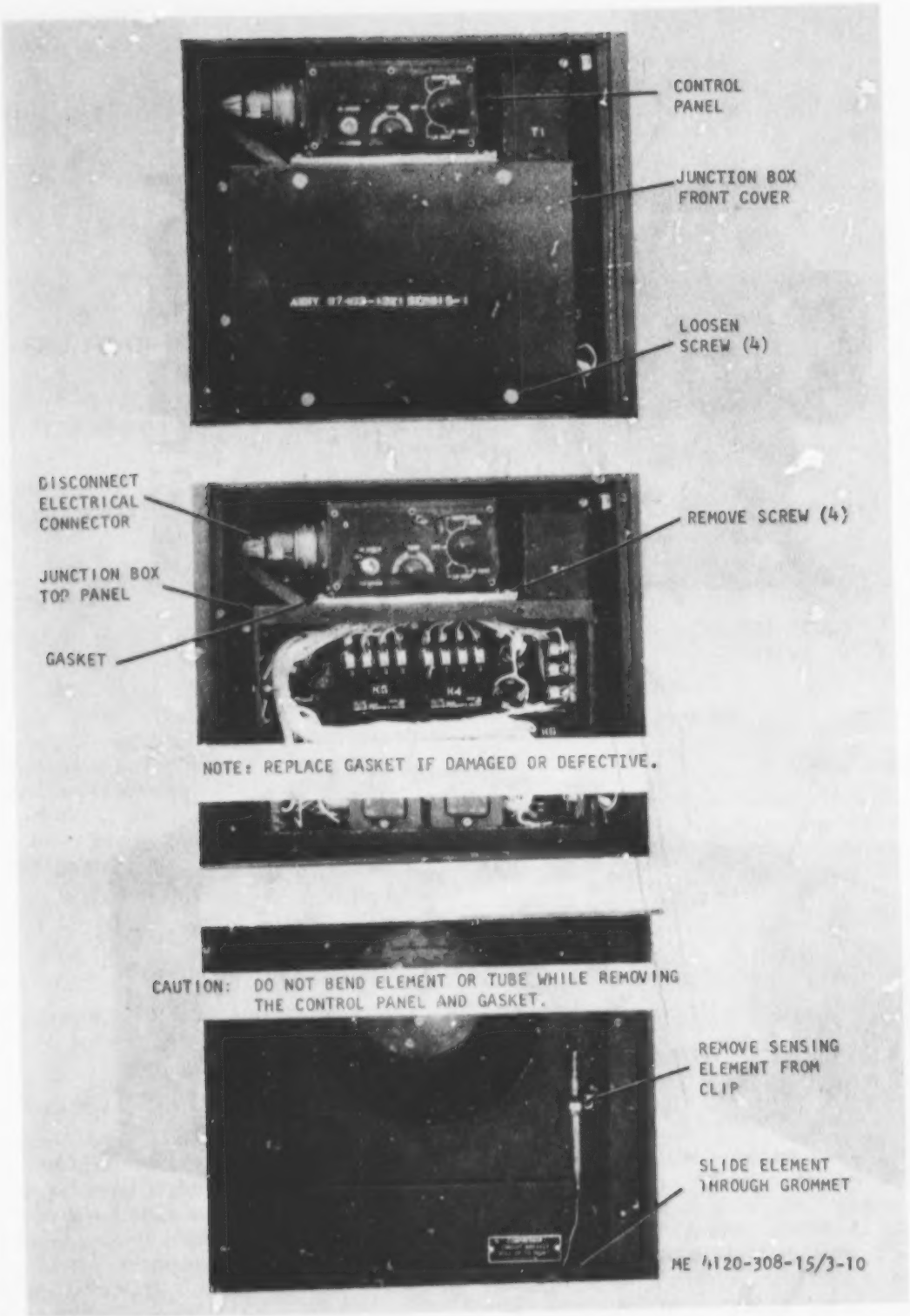

CONTROL PANEL
JUNCTION BOX FRONT COVER
LOOSEN SCREW (4)
DISCONNECT ELECTRICAL CONNECTOR
JUNCTION BOX TOP PANEL
GASKET
REMOVE SCREW (4)
NOTE: REPLACE GASKET IF DAMAGED OR DEFECTIVE.
CAUTION: DO NOT BEND ELEMENT OR TUBE WHILE REMOVING THE CONTROL PANEL AND GASKET.
REMOVE SENSING ELEMENT FROM CLIP
SLIDE ELEMENT THROUGH GROMMET
ME 4120-308-15/3-10

Figure 3-10. Control panel, removal and installation.

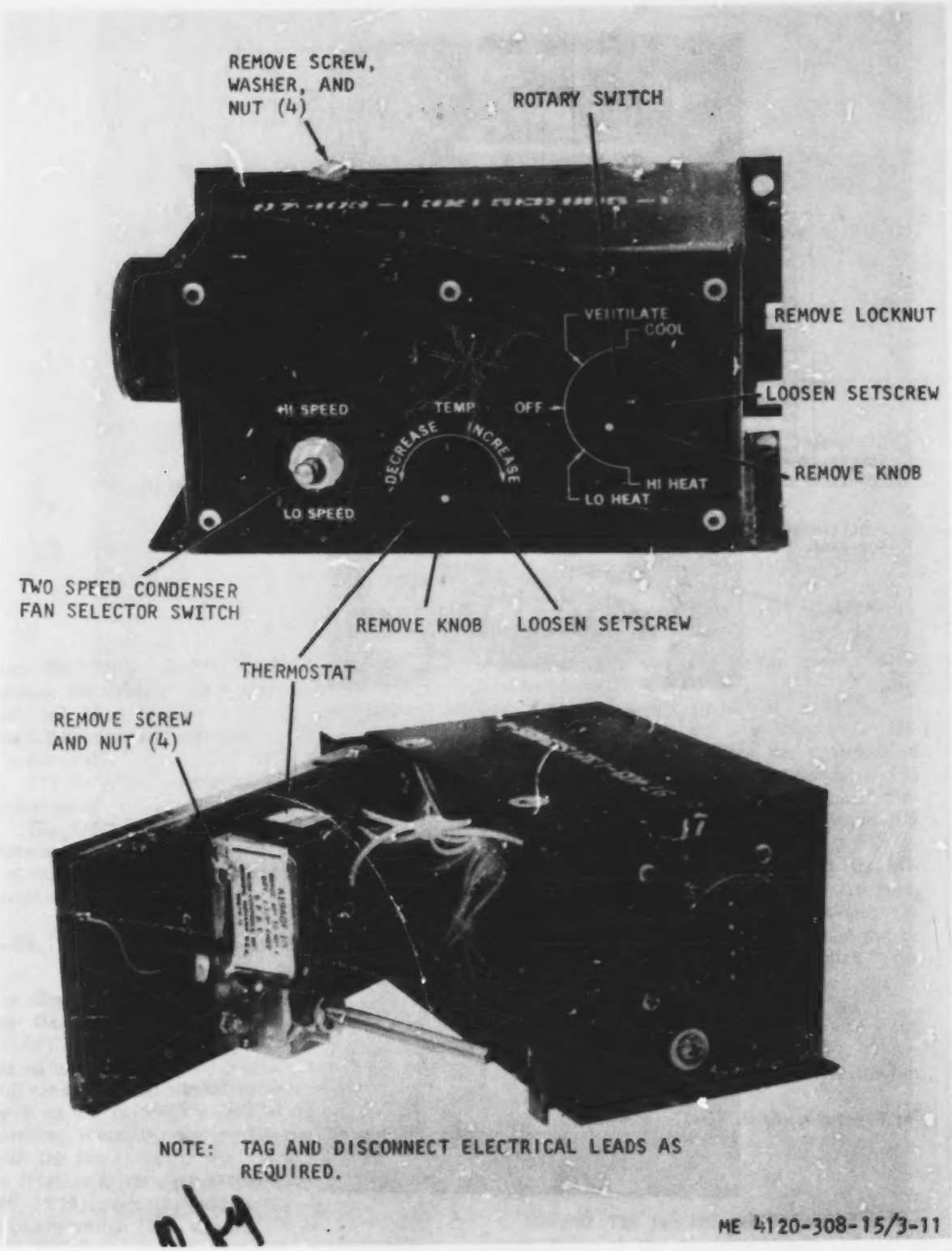


Figure 3-11. Control panel, disassembly and reassembly.

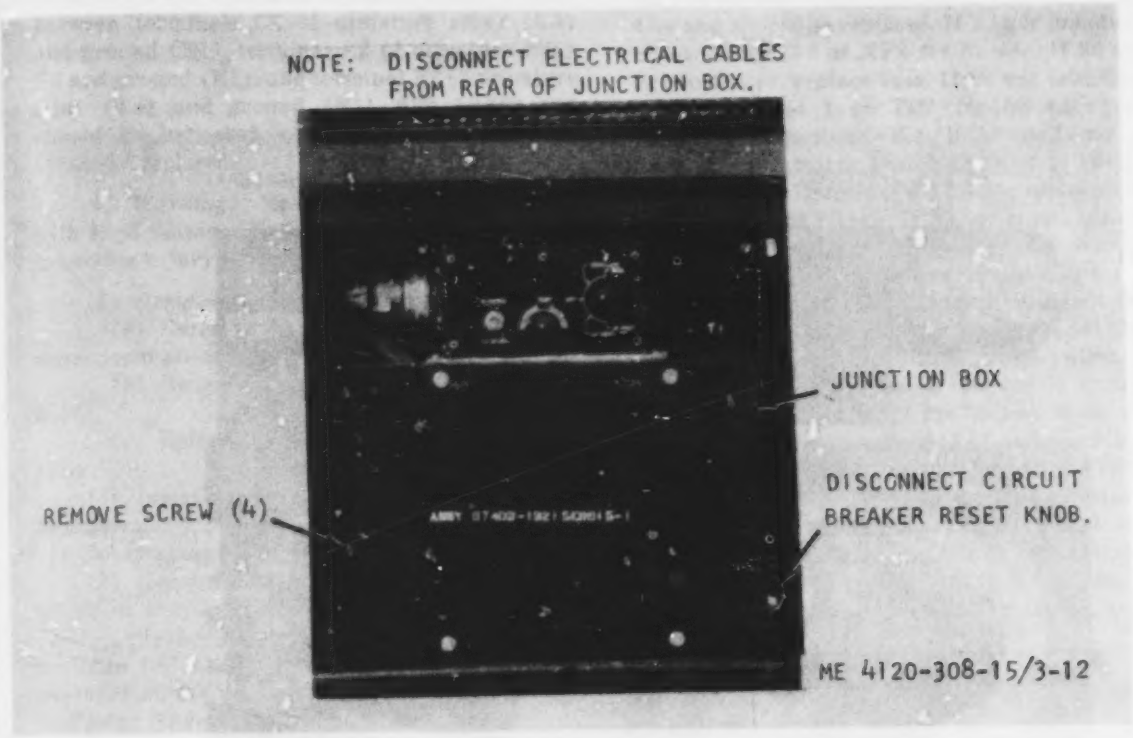

NOTE: DISCONNECT ELECTRICAL CABLES FROM REAR OF JUNCTION BOX.
JUNCTION BOX
DISCONNECT CIRCUIT BREAKER RESET KNOB.
REMOVE SCREW (4)
ME 4120-308-15/3-12

Figure 3–12. Junction box, removal and installation.

mature relays, compressor start relay, heater relay, time delay, circuit breaker, rectifier, terminal boards, and fuse holders and fuses.

b. Removal.

(1) Refer to paragraph 3–26 and remove or disconnect the control panel.

Note. Remove the circuit breaker reset knob prior to removing the junction box.

(2) Refer to figure 3–12 and remove the junction box.

c. Installation. Installation is the reverse of removal.

3–31. Relays

a. Phase Sequence Relay.

(1) *General.* The phase sequence relay, located in the center right corner of the junction box, prevents operation of the compressor unless the phase sequence is correct. This insures proper rotation of the compressor motor and prevents compressor failure.

(2) *Testing.*

(*a*) Apply 208 volts, 60 Hertz, 3-phase (ABC) ac electrical power to the air conditioner. Check for 208 volts, 60 Hertz, 3 phase, power at terminals A, B, and C of phase sequence relay (K6). If not correct, verify correct external power has been connected.

(*b*) Check voltage between terminal 1 of fuse holder (XF1) and junction box ground (E1). 120 (±10) volts should be indicated, or relay is defective and should be replaced.

(3) *Removal.*

(*a*) Refer to figure 3–4 and remove the lower front access cover.

(*b*) Remove cover from junction box (fig. 3–10).

(*c*) Refer to figure 3–13 and remove the relay.

(4) *Installation.* Installation is the reverse of removal.

b. Armature Relays.

(1) *General.* The armature relays (K4 and K5) control electrical power to the fan as called for by the positioning of the two-speed fan switch. When the fan switch is in the LO-SPEED position, an increase in compressor discharge pressure to 400 (±16) psig will close the normally open pressure switch (S3) and cause the armature relay (K4) to close, placing the fan motor in HI-SPEED. When the discharge pressure drops to 350 (±16) psig, the pressure

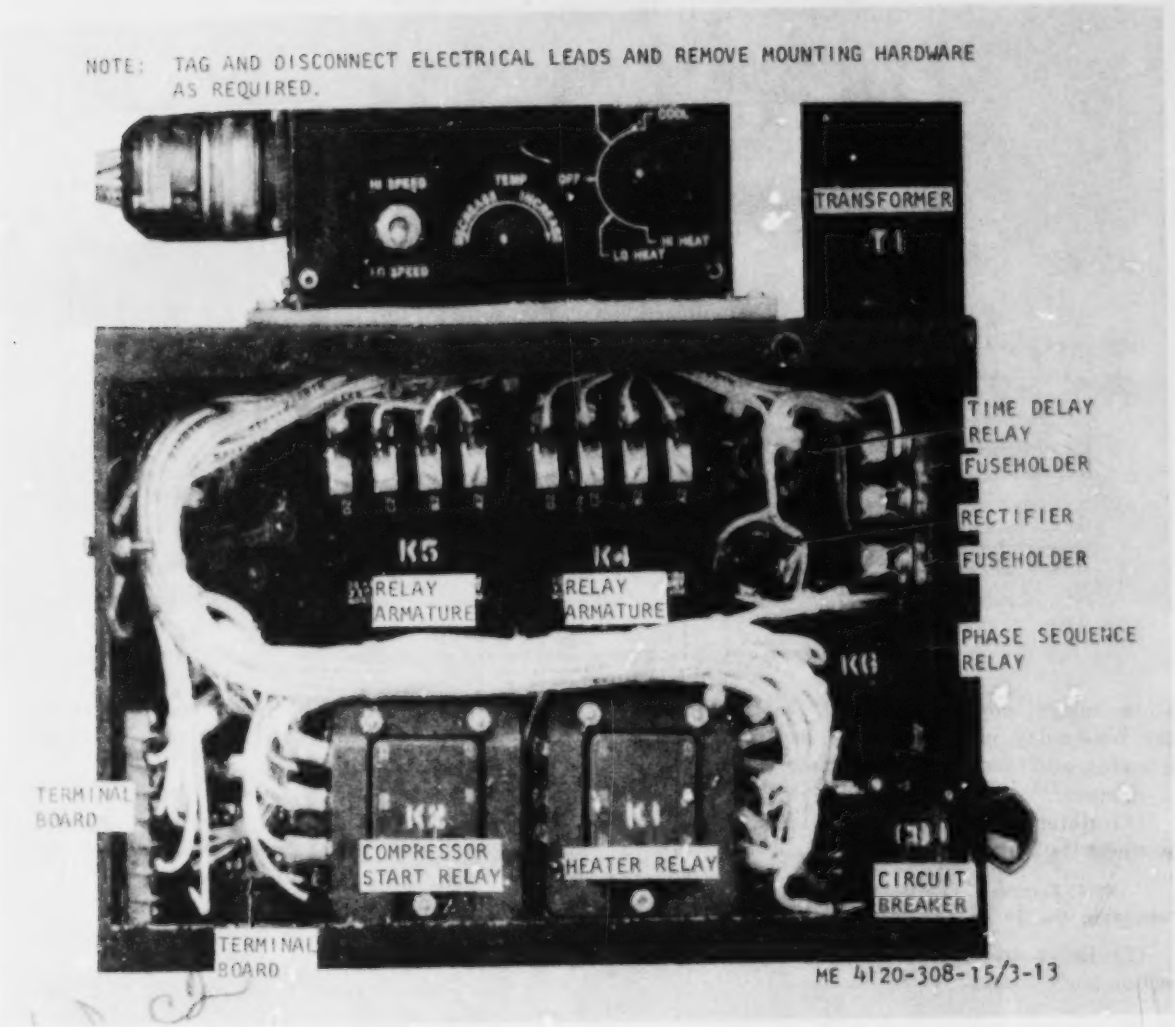


Figure 3-13. Phase sequence relay, circuit breaker, rectifier, compressor start relay, armature relay, heater relay, time delay relay, fuse and fuse holder, and terminal board, removal and installation.

switch (S3) contacts will open, causing relay (K4) to open and the fan speed will return to LO-SPEED.

(2) *Testing.*

(*a*) With power off, check for continuity between A2 and A3, B2 and B3, and D2 and D3 of armature relay (K4). Then check for continuity between C2 and C3 and D2 and D3 of armature relay (K5). If continuity is not indicated, armature relay is defective and must be replaced. If both armature relays indicate proper continuity, proceed to next test.

(*b*) Apply 208 volts, 60 Hertz, 3-phase ac power to air conditioner.

(*c*) Place rotary switch (S1) in VENT position and two-speed switch (S8) in HIGH.

(*d*) Check voltage between terminals X2 of armature relay (K4) and ground (E1), and terminal X2 of armature relay (K5) and ground (E1). 30 (±3) vdc should be indicated, or relay

is defective and should be replaced. Check voltage between terminals C2 of armature relay (K4) and ground (E1), terminal A2 of armature relay K5 and ground (E1), and terminal B2 of armature relay (K5) and ground (E1). 120 (±10) vac should be indicated, or relay is defective and should be replaced.

Warning: **Be careful when working with high voltage. Failure to comply can result in serious injury or death.**

(3) *Removal.*

(*a*) Refer to figure 3–4 and remove the lower front access cover.

(*b*) Remove cover from junction box (fig. 3–10).

(*c*) Refer to figure 3–13 and remove the relay.

(4) *Installation.* Installation is the reverse of removal.

c. Compressor Start Relay.

(1) *General.* The compressor start relay operates in conjunction with the time delay relay (K3) and the high- and low-pressure cutout switches (S6 and S7) to insure proper starting sequence of the refrigerant compressor when either S6 or S7 require non-operation.

(2) *Testing.*

(*a*) Apply 208 volts, 60 Hertz, 3-phase, ac electrical power to the air conditioner.

(*b*) Place rotary switch (S1) in COOL position.

(*c*) Check voltage between terminals X1 and X2 of compressor start relay (K1). 30 vdc (±3) vdc should be indicated. If 30 vdc is indicated, and high-pressure cutout switch (S6), low-pressure cutout switch (S7) and time delay relay (K3) are in operating condition, proceed to check voltage between terminals A2 and B2, B2 and C2, and C2 and A2. If 208 vac is not indicated, compressor relay is defective and must be replaced. If 30 vdc is not indicated between terminals X1 and X2 of relay (K1), check for phase ABC at phase sequence relay (K6) using a phase meter. If phasing is incorrect, check unit incoming power. If phasing is correct, check terminal 2 of relay (K6) for 110 vac. If 110 vac is not indicated, relay is defective and should be replaced. If 110 vac is indicated, check terminal 2 of XF1 for 110 vac. If 110 vac is not indicated, replace fuse. Check for 110 vac at terminal 3 of XF1. If 110 is not indicated, replace fuse. If 110 vac is indicated at terminals 2 and 3 of XF1, check for 30 vac at terminals X1 and X2 of transformer (T1). If 30 vac is not indicated, transformer is defective and should be replaced. If 30 vac is indicated, check terminals 2 and 3 of rectifier (CR1) for 30 vdc. If 30 vdc is not indicated, rectifier is defective and should be replaced. If 30 vdc is indicated, check terminal 2 of XF2 for 30 vdc. If 30 vdc is not indicated, replace fuse. If 30 vdc is indicated, check terminal 1 of TB2 for 30 vdc (rotary switch must be in COOL). If 30 vdc is not indicated, replace rotary switch (S1). If 30 vdc is indicated, check terminal 2 of low-pressure cutout switch (S7) for 30 vdc. If 30 vdc is not indicated, reset switch (S7) and recheck for 30 vdc. If 30 vdc is not indicated, replace low-pressure cutout switch (S7). If 30 vdc is indicated, check terminal 2 of high-pressure cutout switch (S6) for 30 vdc. If 30 vdc is not indicated, reset switch (S6) and recheck for 30 vdc. If 30 vdc is indicated, check terminal 3 of TB2 for 30 vdc. If 30 vdc is not indicated, remove plug (P4) and check resistance between pins D and E of connector (J4). If no resistance, replace compressor. If resistance is indicated, replace connector (J4). If 30 vdc is indicated at terminal 3 of TB2, check terminals 5 and 7 of time delay relay (K3) for 30 vdc. If 30 vdc is not indicated at terminal 7 of K3, replace relay (K3).

(3) *Removal.*

(*a*) Refer to figure 3–4 and remove the lower front access cover.

(*b*) Remove from junction box (fig. 3–10).

(*c*) Refer to figure 3–13 and remove the relay.

(4) *Installation.* Installation is the reverse of removal.

d. Heater Relay.

(1) *General.* The heater relay (K2) closes to supply power to the electric heaters as called for by the KI-HEAT or LO-HEAT setting of the rotary selector switch (S2).

(2) *Testing.*

(*a*) Place rotary switch (S1) in LO-HEAT position.

(*b*) Apply 208 volts, 60 Hertz, 3-phase, ac electrical power to the air conditioner.

(*c*) Check voltage between terminals X1 and X2 of heater relay (K2). 30 vdc should be indicated. If 30 vdc is indicated between terminals X1 and X2, proceed to check voltage between terminals A1 and B1, B1 and C1, and C1 and A1. If 30 vdc is not indicated, heater relay is defective and must be replaced. If 30 (±3) vdc is not indicated, check for 30 vdc to ground (E1) at terminal 2 of thermostat (S2). If 30 vdc is not indicated at terminal 2 of thermostat (S2), check for phase ABC at phase sequence relay (K6), using a phase meter. If phasing is incorrect, check unit incoming power. If phasing is correct, check terminal 2 of relay (K6) for 110 vac. If 110 vac is in-

dicated, check terminal 2 of XF1 for 110 vac. If 110 vac is not indicated, replace fuse. Check for 110 vac at terminal 3 of XF1. If 110 is not indicated, replace fuse. If 110 vac is indicated at terminals 2 and 3 of XF1, check for 30 vac at terminals X1 and X2 of transformer (T1). If 30 vac is not indicated, transformer is defective and should be replaced. If 30 vac is indicated, check terminals 2 and 3 of rectifier (CR1) for 30 vdc. If 30 vdc is not indicated, rectifier is defective and should be replaced. If 30 vdc is indicated, check terminal 2 of XF2 for 30 vdc. If 30 vdc is not indicated, replace fuse. If 30 vdc is indicated at terminal 2 of thermostat (S2), replace rotary selector switch (S1).

(3) *Removal.*

(*a*) Refer to figure 3–4 and remove the lower front access panel.

(*b*) Remove cover from junction box (fig. 3–10).

(*c*) Refer to figure 3–13 and remove the relay.

(4) *Installation.* Installation is the reverse of removal.

e. Time Delay Relay.

(1) *General.* The time delay relay (K2) is employed in the start circuit to delay starting of the refrigerant compressor for approximately 30 seconds after the rotary selector switch (S1) has been placed in the COOL position. This allows the fan motor to start and come up to operating speed before the compressor comes on the line, preventing a power overload condition.

(2) *Testing.*

(*a*) With power off, check for continuity between terminals 2 and 3 and 5 and 7 of time delay relay (K3). If continuity is not indicated between terminals 2 and 3 and/or is indicated between terminals 5 and 7, time delay relay is defective and must be replaced. If continuity is indicated between terminals 2 and 3 and/or is not indicated between terminals 5 and 7, check for phase ABC at phase sequence relay (K6), using a meter. If phasing is incorrect, check unit incoming power. If phasing is correct, check terminal 2 of relay (K6) for 110 vac. If 110 vac is not indicated, relay is defective and should be replaced. If 110 vac is indicated, check terminal 2 of XF1 for 110 vac. If 110 vac is not indicated, replace fuse. Check for 110 vac at terminal 3 of XF1. If 110 is not indicated, replace fuse. If 110 vac is indicated at terminals 2 and 3 of XF1, check for 30 vac at terminals X1 and X2 of transformer (T1). If 30 vac is not indicated, transformer is defective and should be replaced. If 30 vac is indicated, check terminals 2 and 3 of rectifier (CR1) for 30 vdc. If 30 vdc is not indicated, rectifier is defective and should be replaced. If 30 vdc is indicated, check terminal 2 of XF2 for 30 vdc. If 30 vdc is not indicated, replace fuse. If 30 vdc is indicated, check terminal 1 of TB2 for 30 vdc (rotary switch must be in COOL).

If 30 vdc is not indicated, replace rotary switch (S1). If 30 vdc is indicated, check terminal 2 of low-pressure cutout switch (S7) for 30 vdc. If 30 vdc is not indicated, reset switch (S7), and recheck for 30 vdc. If 30 vdc is not indicated, replace low-pressure cutout switch (S7). If 30 vdc is indicated, check terminal 2 of high-pressure cutout switch (S6). If 30 vdc is not indicated, reset switch (S6) and recheck for 30 vdc. If 30 vdc is not indicated, replace high-pressure cutout switch (S6). If 30 vdc is indicated, check terminal 3 of TB2 for 30 vdc. If 30 vdc is not indicated, remove plug (P4) and check resistance between pins D and E of connector (J4). If no resistance, replace compressor. If resistance is indicated, replace connector (J4). If 30 vdc is indicated at terminals 3 of TB2, check terminal 5 and 7 of time delay relay (K3) for 30 vdc. If 30 vdc is not indicated at terminal 7 of K3, replace relay (K3).

(3) *Removal.*

(*a*) Refer to figure 3–4 and remove the lower front access panel.

(*b*) Remove cover from junction box (fig. 3–10).

(*c*) Refer to figure 3–13 and remove the relay.

(4) *Installation.* Installation is the reverse of removal.

3–32. Circuit Breaker

a. General. The circuit breaker is a 3-pole, single-throw, series-trip type with auxiliary switch. The 5-ampere circuit breaker protects the compressor from continuous overcurrent and short circuits. It is located in the lower right corner of the junction box. Refer to figure 2–5 for reset procedure.

b. Testing. With power off and circuit breaker in ON position, check for continuity between A1 and A2, B1 and B2, C1 and C2, and C and NO. If continuity is not indicated, circuit breaker is defective and must be replaced.

c. Removal.

(1) Refer to figure 3–4 and remove the lower front access cover.

(2) Remove from junction box (fig. 3–10).

(3) Refer to figure 3–13 and remove the circuit breaker.

d. Installation. Installation is the reverse of removal.

3–33. Rectifier

a. General. The rectifier is located on the center right side of the junction box. It changes 30-volt alternating current to 30-volt direct current for operation of the armature relays, compressor start relay, time delay relay and solenoid valves.

b. Testing.

(1) Apply 208 volt, 60 Hertz, 3-phase power to air conditioner.

(2) Check voltage between terminals 1 and 4. 30 vac should be indicated. Check voltage between terminals 2 and 3; 30 vdc should be indicated. If 30 vdc is not indicated, replace the rectifier. If 30 vac is not indicated between terminals 1 and 4 of rectifier (CR1), check for phase ABC at phase sequence relay (K6), using a phase meter. If phasing is incorrect, check unit incoming power. If phasing is correct, check terminal 2 of relay (K6) for 110 vac. If 110 vac is not indicated, relay is defective and should be replaced. If 110 vac is indicated, check terminal 2 of XF1 for 110 vac. If 110 vac is not indicated, replace fuse. Check for 110 vac at terminal 4 of XF1. If 110 vac is not indicated, check terminal NO of circuit breaker (CB1) for 110 vac. Reset circuit breaker (CB1). Check for 110 vac at terminal 3 of XF1. If 110 is not indicated, replace fuse. If 110 vac is indicated at terminals 2 and 3 of XF1, check for 30 vac at terminals X1 and X2 of transformer (T1). If 30 vac is not indicated, transformer is defective and should be replaced.

Warning: **Be careful when working with high voltage. Contact with high voltage can result in serious injury or death.**

c. Removal.

(1) Refer to figure 3–1 and remove the lower front access cover.

(2) Remove cover from junction box (fig. 3–10).

(3) Refer to figure 3–13 and remove the rectifier.

d. Installation. Installation is the reverse of removal.

3–34. Transformer

a. General. The transformer reduces the 208 vac input electrical power to 30 (±3%) vac required by the rectifier. It is mounted on top right external panel of the junction box, adjacent to the control panel.

b. Testing.

(1) Apply 208 volt, 60 Hertz, 3-phase power to air conditioner.

(2) Check voltage between terminals X1 and X2 of transformer (T1). 30 vac should be indicated, or transformer is defective and should be replaced.

c. Removal.

(1) Refer to figure 3–4 and remove lower front access cover.

(2) Remove cover from junction box (fig. 3–10).

(3) Refer to figure 3–13 and remove transformer.

d. Installation. Installation is the reverse of removal.

3–35. Terminal Boards

a. General. There are two terminal boards mounted in the lower left corner of the junction box. Electrical power is distributed from these terminal boards to all electrical components of the air conditioner. All terminal boards are removed and installed in a similar manner.

b. Removal.

(1) Refer to figure 3–4 and remove lower front access cover.

(2) Remove cover from junction box (fig. 3–10).

(3) Refer to figure 3–13 and remove terminal board.

c. Installation. Installation is the reverse of removal.

3–36. Fan Motor

a. General. One double extended shaft motor is provided for driving both the condenser and evaporator fans. The motor operates in either low speed or high speed, depending on the setting of the two-speed motor switch. A pressure control switch automatically controls the speed of the fan motor when the two-speed switch is in the LO-SPEED position by overriding the LO position and switching to HI-SPEED when the condenser pressure reaches 400 psig; when the pressure reduces to 350 psig, the motor speed is returned to the LO position.

b. Testing.

(1) Remove condenser fan (para 3–24) and baffle (fig. 3–16).

(2) 13215E9824–2, 0.125 in.
motor.

(3) Check for continuity across each combination of two motor terminals; if continuity is not indicated, the motor is defective and must be replaced.

(4) Place one probe of the continuity tester against the motor housing and the other probe against each of the motor terminals, one at a

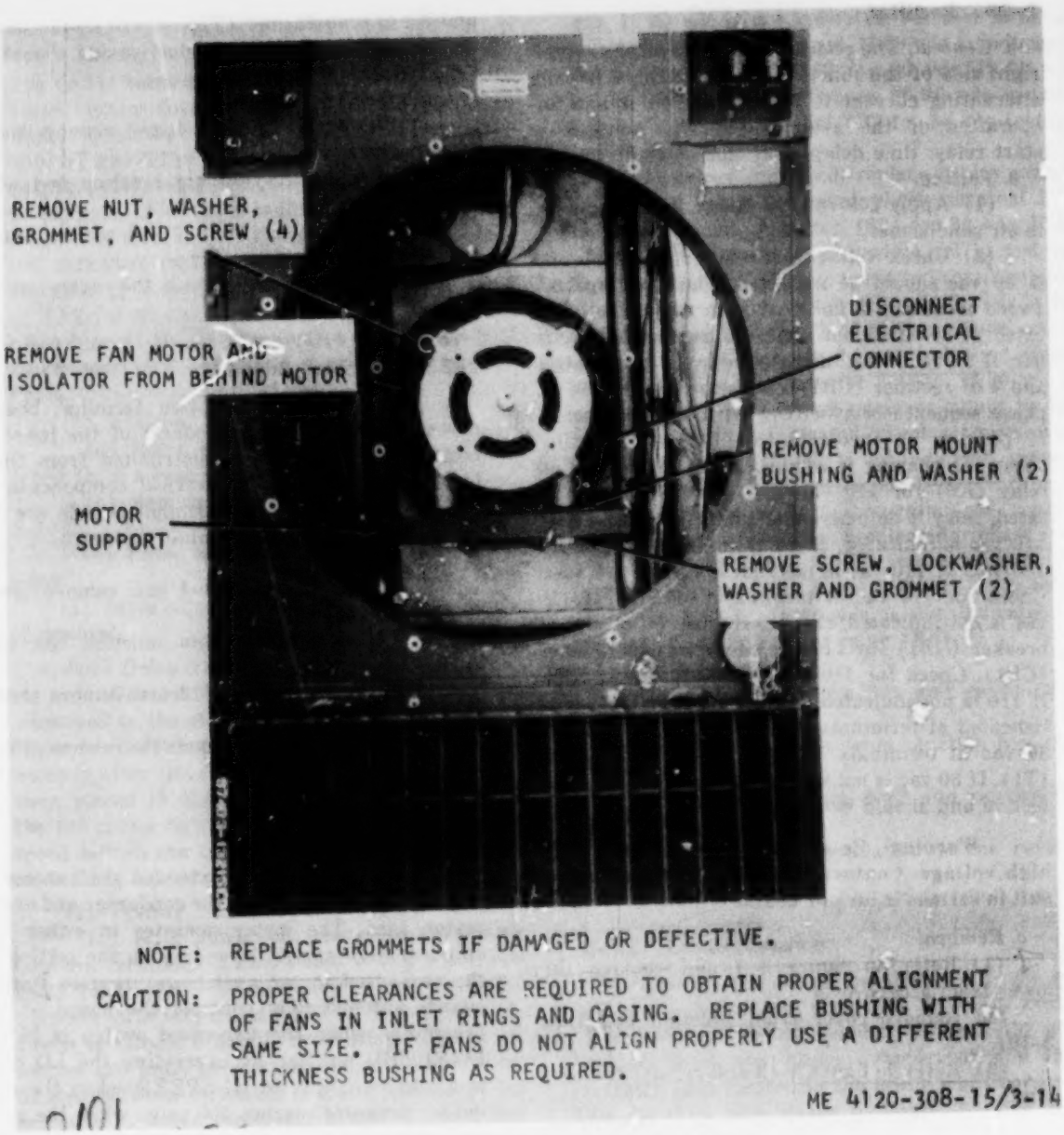

REMOVE NUT, WASHER, GROMMET, AND SCREW (4)
REMOVE FAN MOTOR AND ISOLATOR FROM BEHIND MOTOR
MOTOR SUPPORT
DISCONNECT ELECTRICAL CONNECTOR
REMOVE MOTOR MOUNT BUSHING AND WASHER (2)
REMOVE SCREW, LOCKWASHER, WASHER AND GROMMET (2)
NOTE: REPLACE GROMMETS IF DAMAGED OR DEFECTIVE.
CAUTION: PROPER CLEARANCES ARE REQUIRED TO OBTAIN PROPER ALIGNMENT OF FANS IN INLET RINGS AND CASING. REPLACE BUSHING WITH SAME SIZE. IF FANS DO NOT ALIGN PROPERLY USE A DIFFERENT THICKNESS BUSHING AS REQUIRED.
ME 4120-308-15/3-14

Figure 3-14. Fan motor, removal and replacement.

time. If continuity is indicated between any terminal and the housing, the motor is defective and must be replaced.

(5) Check cold resistance tolerance at terminals A and D, E and B, and F and C (fig. 1-4). Resistance at each terminal should be 7.25 (±1) ohm.

c. Removal.

(1) Refer to paragraph 3-24 and remove the condenser fan.

(2) Refer to figure 3-16 and remove the baffle.

(3) Refer to paragraph 3-23 and remove the evaporator fan.

(4) Refer to figure 3-14 and remove the fan motor.

c. Installation. Installation is the reverse of removal.

3-37. Fan Motor Mount Bushing

a. General. The fan motor mount bushing cushions motor vibration and aids in properly alining the condenser and evaporator fans in the inlet

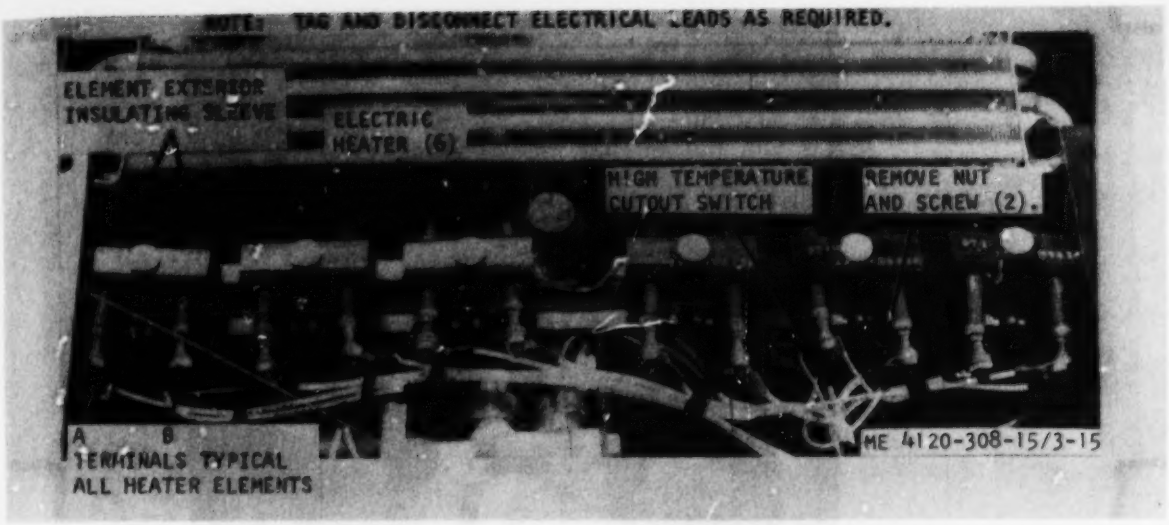

NOTE: TAG AND DISCONNECT ELECTRICAL LEADS AS REQUIRED.
ELEMENT EXTERIOR INSULATING SLEEVE
ELECTRIC HEATER (6)
HIGH TEMPERATURE CUTOUT SWITCH
REMOVE NUT AND SCREW (2).
A B
TERMINALS TYPICAL ALL HEATER ELEMENTS
ME 4120-308-15/3-15

Figure 3–15. Electric heaters.

rings and casing. Four bushing sizes are available as follows:

(1) 13215E9824–1, 0.094 in.
(2) 13215E9824–2, 0.125 in.
(3) 13215E9824–3, 0.156 in.
(4) 13215E9824–4, 0.188 in.

b. Removal. The mount bushing is removed by removing the fan motor (para 3–36).

c. Inspection. Inspect the mount bushing for deformation, deterioration, and damage.

d. Installation. Installation is the reverse of removal.

3–38. Electric Heaters

a. General. Six electrical resistance heaters are mounted directly behind the evaporator coil. The heaters provide the heat called for by the thermostat and rotary selector switch settings to maintain the required temperature of the conditioned air. Positioning the rotary selector switch in the HI-HEAT position places all six heater elements in operation. Moving the selector switch to the LO-HEAT position reduces the heating capacity by supplying power to only three heater elements.

b. Testing.

(1) Refer to figure 3–4 and remove the top access cover.

(2) Tag and disconnect wires from heater (fig. 3–15).

(3) Check for continuity between terminals A and B of heater (fig. 3–15). There should be continuity.

(4) Check for continuity between heater terminals and heater element exterior insulating sleeve. There should be no continuity.

(5) Check heater resistance is no less than the following values:

(*a*) Cold resistance (70° to 75° F)—1.43 megohms.

(*b*) Hot resistance (operating temperature)—1.06 megohms.

3–39. Condenser Fan Baffle

a. General. The condenser fan baffle is located directly behind the condenser fan. The baffle helps to reduce condenser fan noise. The condenser fan must be removed to gain access to the baffle.

b. Removal.

(1) Refer to paragraph 3–24 and remove the condenser fan.

(2) Refer to figure 3–16 and remove the baffle.

c. Installation. Installation is the reverse of removal.

3–40. Refrigerant Compressor Mounts

a. Inspection.

(1) Refer to paragraph 3–30 and remove the junction box.

(2) Refer to figure 3–17 and inspect the compressor mounts for damage, deformation, and deterioration.

b. Removal. Report a defective condition to direct support maintenance.

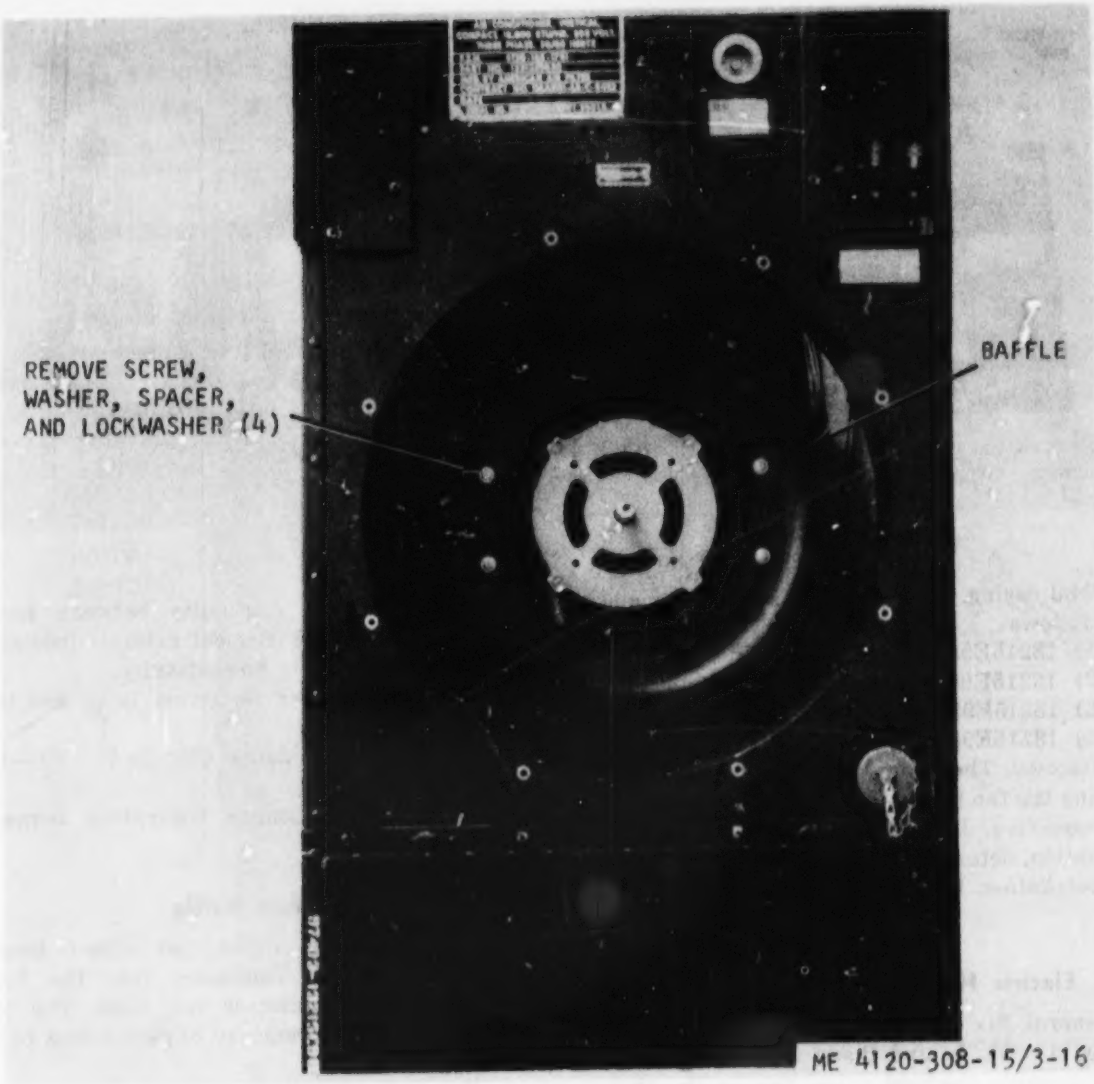


Figure 3–16. Condenser fan baffle, removal and installation.

3–41. High Temperature Cutout Switch

a. General. The high temperature cutout switch is provided to shut down the electric heaters in the event of interrupted evaporator airflow and protects the heaters against high temperature.

b. Testing.

(1) Remove cutout switch electrical leads from heater terminals (fig. 3–15).

(2) Test the high temperature cutout switch by checking continuity between terminals 4 and 5, 5 and 6, and 4 and 6 (fig. 1–4). Continuity should exist in each check.

c. Removal.

(1) Refer to figure 3–4 and remove the top access cover.

(2) Refer to figure 3–15 and remove the cutout switch.

d. Installation. Installation is the reverse of removal.

3–42. Condensate Drain Tubes

a. General. Two condensate tubes are provided to drain condensate from the evaporator condensate drain pan (fig. 3–18). A ball and spring-type check valve is provided at the outlet end of each drain tube to prevent loss of evaporator air. The check valves open intermittently when the weight of the condensate is sufficient to overcome the force of the spring.

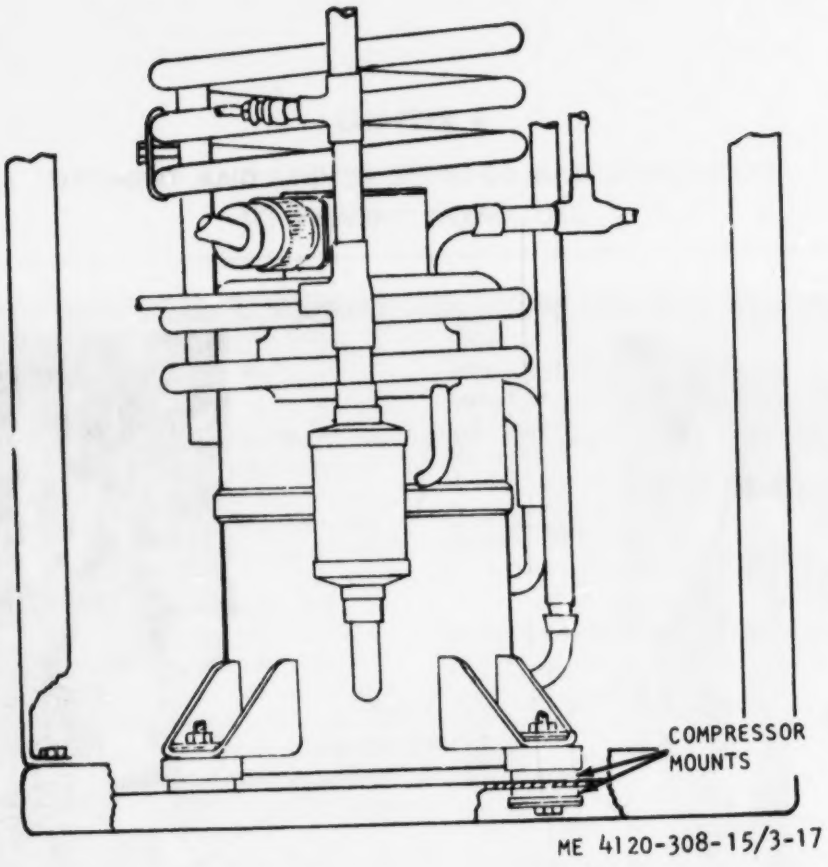


Figure 3–17. Refrigerant compressor mounts.

b. Removal.

(1) Refer to figure 3–4 and remove the front access cover.

(2) Refer to paragraph 3–30 and remove the junction box.

(3) Refer to figure 3–18 and remove the condensate drain tubes.

c. Servicing. Check tubes for freedom of obstruction and verify check valves are free to move. Rinse tubes with clean fresh water.

d. Installation. Installation is the reverse of removal.

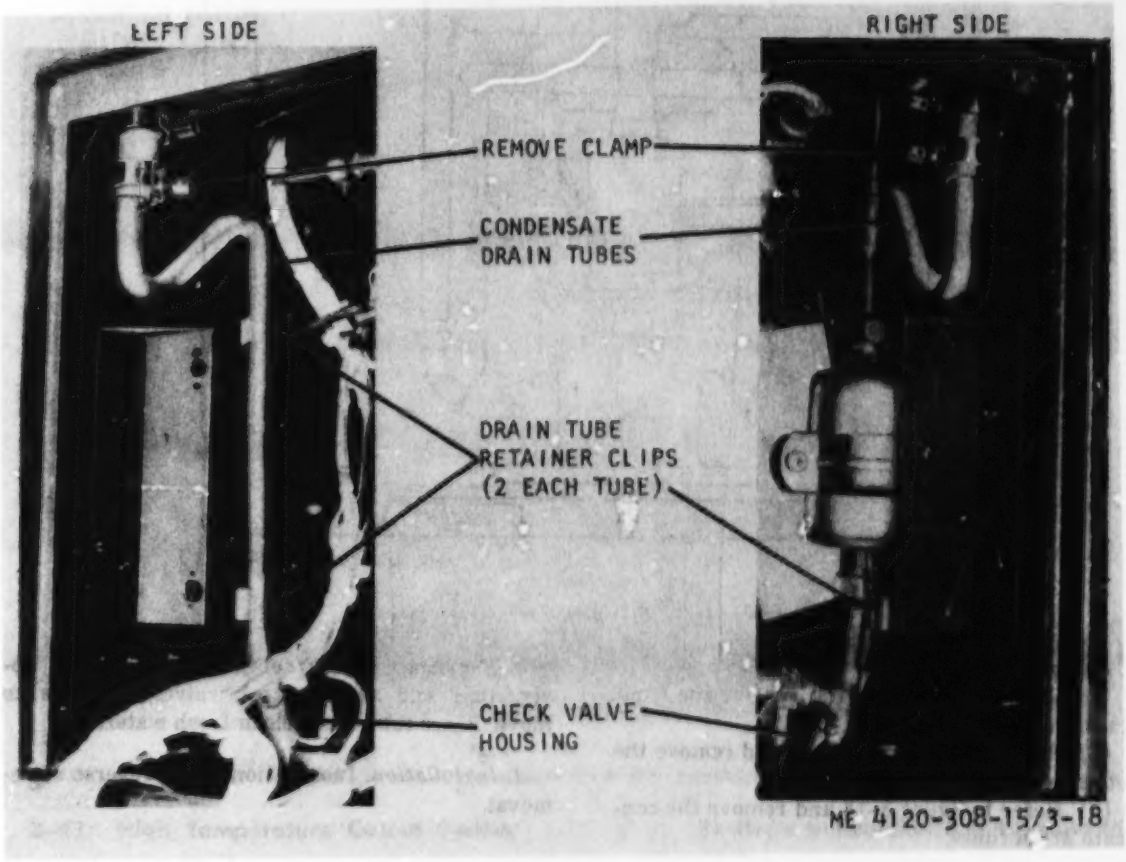


Figure 3-18. Condensate drain tube, removal and installation.

CHAPTER 4

SHIPMENT AND LIMITED STORAGE AND DEMOLITION TO PREVENT ENEMY USE

Section I. SHIPMENT AND LIMITED STORAGE

4–1. Preparation of Equipment for Shipment

a. General. Detailed instructions for the preparation of the air conditioner for domestic shipment are outlined within this paragraph. Preservation will be accomplished in a sequence that will not require the operation of previously preserved components.

b. Inspection. The air conditioner shall be inspected for any unusual condition such as damage, rusting, accumulation of water, and pilferage. Inspect in accordance with steps outlined in the Quarterly Preventive Maintenance Services.

c. Cleaning and Drying. Thoroughly clean the air conditioner by the most applicable approved method. Approved methods for cleaning and drying are described in TM 38–230.

d. Painting. Paint all surfaces when the paint has been removed or damaged. Refer to TM 9–213 for detailed cleaning and painting instructions.

e. Depreservation Guide. Record depreservation instructions on DA Form 2258 (Preservation and Depreservation Guide for Vehicles and Equipment) concurrently with the preservation of each air conditioner. Record any peculiar requirements in blocks 28 through 33. Place the completed depreservation forms in a waterproof envelope marked "Depreservation Guide" and secure in a conspicuous location on or near operational controls.

f. Sealing of Openings. Seal all openings that will permit the direct entry of water, such as the discharge grille, intake grille, fresh air inlet screen and filter, and condenser fan guard. Seal small openings with pressure-sensitive tape conforming to type IV of specification PPP–T–60. Cover large openings with waterproof wrapping paper conforming to specification UU–P–271, and seal edges with pressure-sensitive tape.

g. Exterior Surfaces. Coat exposed machine ferrous metal surfaces with GAA–Grease. Automotive and Artillery.

h. Packing. Utilize original container, if available; otherwise, refer to TM 38–230 for guidance in container selection and fabrication. Pack publications with air conditioner.

i. Marking. Marking shall conform to the requirements of Standard MIL–STD–129.

4–2. Loading Equipment for Shipment

a. Load air conditioner with a forklift or other suitable method.

b. Secure air conditioner to carrier with blocks and tiedowns.

4–3. Preparation of Equipment for Storage

a. General. This paragraph covers preparation of the air conditioner for limited storage. Limited storage is defined as storage not to exceed six months.

b. Preparation. Perform the steps outlined in paragraphs 4–1*b* through 4–1*h*. Closed storage is preferred for the air conditioner; if this type storage is not available, select a firm, level, well drained location protected from prevailing winds. Position the air conditioner off the ground on planking or other solid surfaces. Cover the air conditioner with a tarpaulin or other suitable waterproof covering and secure it in place to prevent it from being blown off.

4–4. Inspection and Maintenance of Equipment in Storage

Inspect the air conditioner and perform the preventive maintenance checks and services in paragraph 3–5, every ninety days. Operate the air conditioner long enough to assure complete lubrication of the system. Immediately correct all deficiencies that are discovered or forward the unit

to the proper maintenance echelon for repair. Upon completion of inspection, return the air conditioner to storage following the procedure outlined in paragraph 4–3.

Section II. DEMOLITION OF EQUIPMENT TO PREVENT ENEMY USE

4–5. General

When capture or abandonment of the air conditioner to an enemy is imminent, the responsible unit commander must make the decision either to destroy the equipment or to render it inoperative. Based on this decision, orders are issued which cover the desired extent of destruction. Whatever method of demolition is employed, it is essential to destroy the same vital parts of all air conditioners and all corresponding repair parts.

4–6. Demolition to Render Equipment Inoperative

a. Mechanical Means. Use sledge hammers, crowbars, picks, axes, or any other heavy tools which may be available to destroy the following:

(1) Compressor and compressor motor.

(2) Condenser assembly.

(3) Evaporator assembly.

(4) Condenser and evaporator fans.

Note. The procedures in (1) thru (4) are minimum requirements for this method.

(5) Remove control panel and junction box.

b. Misuse. Perform the following steps to render the air conditioner inoperative.

(1) Remove the air conditioning filter, and drop nuts, bolts, or small metallic objects into the evaporator fan housing.

(2) Pull circuit breaker up and plug in the main power cable.

Note. The procedures in (1) and (2) above are minimum requirements for this method.

4–7. Demolition by Explosives or Weapons Fire

a. Explosives. Place as many of the charges as the situation permits, and detonate them simultaneously with a detonating cord and suitable detonator.

(1) One ½-pound charge inside the junction box.

(2) One ½-pound charge on the condenser fan.

(3) One ½-pound charge on the compressor.

(4) One ½-pound charge next to the evaporator assembly.

Note. The charges are a minimum requirement for this method.

b. Weapons Fire. Fire on the air conditioner with the heaviest practicable weapons available.

4–8. Other Demolition Methods

a. Scattering and Concealment. Remove all easily accessible parts, such as the remote control box and wiring harness, and scatter them through dense foliage, bury them, or throw them in a body of water.

b. Burning. Pack rags, clothing, or canvas under and around the unit and inside the condenser and evaporator frames. Saturate this packing with gasoline, oil, or diesel fuel, and ignite.

c. Submersion. Totally submerge the unit in a body of water to provide water damage and concealment. Salt water will do greater damage to metal parts than fresh water.

4–9. Training

All operators should receive thorough training in the destruction of the air conditioner. Refer to FM 5–25. Simulated destruction, using all of the methods listed above, should be included in the operator training program. It must be emphasized in training that demolition operations are usually necessitated by critical situations when time available for carrying out destruction is limited. For this reason, it is necessary that operators be thoroughly familiar with all methods of destruction of equipment, and be able to carry out demolition instructions without reference to this or any other manual

CHAPTER 5

DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE INSTRUCTIONS

Section I. GENERAL

5–1. Scope

These instructions are published for the use of direct, general support and depot maintenance personnel maintaining the American Air Filter Model CH620–2 Air Conditioner. They provide information on the maintenance of the equipment which is beyond the scope of the tools, equipment, personnel, or supplies normally available to using organizations.

5–2. Forms and Records

a. DA Forms and records used for equipment maintenance will be only those prescribed in TM 38–750.

b. The direct reporting of errors, omissions, and recommendations for improving this equipment publication by the individual user is authorized and encouraged. DA Forms 2028 (Recommended Changes to Publications) will be used for reporting these improvements. DA Form 2028 will be completed by the individual using the manual and forwarded directly to the Commanding General, U.S. Army Mobility Equipment Command, ATTN: AMSME-MPP, 4300 Goodfellow Boulevard, St. Louis, Mo. 63120.

Section II. DESCRIPTION AND DATA

5–3. Description

For a complete description of the air conditioner, refer to paragraph 1–3.

5–4. Tabulated Data

a. Refrigerant Compressor.

Manufacturer	Whirlpool
Model	WHP622H18–208–3
Part number	474837
Type	Rotary vane
Lubrication	Forced feed
RPM	3390
Volts	208
Phase	3
Cycles	50/60
Lra (locked rotor amperage)	67.0
Cube	0.94 cu ft
Weight	56.1 lbs
Oil charge	20.5 oz
Oil type	Texaco Capella "D"

b. Fan Motor.

Manufacturer	Welco Industries
Type	Double extended shaft
RPM	3450 (HI-SPEED) 1750 (LO-SPEED)
HP	1.42 (3450 rpm) 0.18 (1750 rpm)
Volts	208
Phase	3
Cycles	60
Amperes (full load)	4.2 (3450 rpm) 0.8 (1750 rpm)
Amperes (locked rotor)	18.0 (3450 rpm) 3.5 (1750 rpm)
Duty	Continuous
Drive	Direct

c. Condenser Coil.

Manufacturer	Bohn Aluminum and Brass Co.
Type	Aluminum tube and fin
Part No.	M4449–1

d. Evaporator Coil.

Manufacturer	Bohn Aluminum and Brass Co.
Type	Aluminum tube and fin
Part No.	M4448–1

e. Dehydrator.

Effective volume of desiccant.	8 cu in.
Water capacity in drops	89 at 75° F

Section III. SPECIAL TOOLS, AND EQUIPMENT

5–5. Special Tools and Equipment

No special tools or equipment are required to perform direct and general support and depot maintenance on the air conditioner.

5–6. Direct and General Support and Depot Maintenance Repair Parts

Direct and general support and depot maintenance repair parts are listed and illustrated in TM 5–4120–308–25P (when published).

5–7. Specially Designed Tools and Equipment

No specially designed tools or equipment are required to perform direct and general support and depot maintenance on the air conditioner.

Section IV. TROUBLESHOOTING

5–8. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the air conditioner and its components. Malfunctions which may occur are listed in table 5–1. Each malfunction stated is followed by a list of probable causes of the trouble. The corrective action recommended is described opposite the probable cause.

Table 5–1. Troubleshooting

Malfunction	Probable cause	Corrective action
1. Compressor fails to start.	a. Compressor defective.	a. Replace compressor (para 5–23).
	b. Compressor relay defective.	b. Replace compressor relay (para 3–31).
	c. Defective wiring.	c. Repair or replace wiring.
	d. Compressor overload protector defective.	d. Replace compressor (para 5–23).
	e. Thermostat defective.	e. Replace thermostat (para 3–28).
	f. Defective high- or low-pressure cutout switch.	f. Replace switches (para 5–19 and 5–20).
2. Compressor starts but goes out on overload.	a. Expansion valve defective.	a. Replace valve (para 5–18).
	b. Discharge pressure too high.	b. Remove small amount of refrigerant.
	c. Compressor defective.	c. Replace compressor (para 5–23).
	d. Suction pressure too low.	d. Check refrigerant level in sight glass. Test for leaks and charge system (para 6–5).
3. Little or no heating capacity.	a. Wiring defective.	a. Repair or replace wiring.
	b. Fan motor defective.	b. Repair motor (para 6–4).
4. Suction pressure inadequate or low.	a. Expansion valve not adjusted properly.	a. Adjust valve (para 5–18).
	b. Expansion valve defective.	b. Replace valve (para 5–18).
	c. Dirty filter.	c. Clean filter (para 3–7).
	d. Improperly adjusted (closed) evaporator return and discharge air grilles or fresh air and CB intake.	d. Adjust grille louvers and damper doors (para 2–8).
	e. Dehydrator defective.	e. Replace dehydrator (para 5–21).
	f. Pressure regulating valve inoperative or defective.	f. Adjust or replace valve (para 5–13).
5. Discharge pressure inadequate.	Compressor defective.	Replace compressor (para 5–23).
6. Suction pressure too high.	a. Pressure equalizer solenoid valve defective.	a. Replace valve (para 5–15).
	b. Hot gas bypass solenoid valve defective.	b. Replace valve (para 5–15).
	c. Pressure regulator out of adjustment.	c. Adjust or replace valve as required (para 5–13).
	d. Superheat adjustment incorrect.	d. Adjust thermostat expansion valve (para 5–17 or 5–18).

Table 5–1.—Continued

Malfunction	Probable cause	Corrective action
	e. Expansion valves defective or out of adjustment.	*e.* Replace or adjust valves as required (para 5–17 or 5–18).
	f. Compressor defective.	*f.* Replace compressor (para 5–23).
7. Discharge pressure too high.	*a.* Insufficient volume of air passing through condenser coil.	*a.* Service condenser coil and screen (para 3–8).
	b. Refrigerant overcharged.	*b.* Remove small amount of refrigerant.
	c. Defective solenoid valve.	*c.* Replace (para 5–14).
	d. Incorrectly set or defective expansion valves.	*d.* Adjust or replace (para 5–17).
8. Suction and discharge pressure low.	*a.* Lack of refrigerant.	*a.* Check refrigerant level in sight glass. Test for leaks and charge system (para 6–5.)
	b. Insufficient airflow across evaporator coil.	*b.* Check evaporator discharge and return air grilles, air filter, mist eliminator and evaporator coil for dirt or other obstructions. Service (para 3–6, 3–7, and 3–8).
9. High suction pressure with low discharge pressure.	Compressor defective.	Replace compressor (para 5–23).
10. System losing cooling capacity.	*a.* Suction or discharge pressure not correct.	*a.* Check suction and discharge pressures (table 5–2 and para 6–6).
	b. Ice on coil.	*b.* Check pressure regulating valve.
11. Sight glass indicates CAUTION or WET.	Moisture in refrigerant system.	Perform leak test (para 6–5), replace dehydrator (para 5–21), evacuate, and charge system (para 6–5).

Table 5–2. Normal Operating Pressures

	95° F RETURN AIR TO UNIT				
Outdoor Ambient Temperature	50° F	75° F	100° F	110° F	125° F
Gage Pressures:					
Suction	56—60	56—65	65—75	70—80	75—90
Discharge	135—155	185—205	275—295	375—380	400—420
	80° F RETURN AIR TO UNIT				
Outdoor Ambient Temperature	50° F	75° F	100° F	125° F	
Gage Pressures:					
Suction	minimum 56	minimum 56	56—65	65—75	
Discharge	130—150	180—200	270—290	290—410	

Section V. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS AND AUXILIARIES

5–9. Evaporator Coil

a. Removal.

(1) Discharge the refrigerant system (para 6–3).

(2) Refer to figure 3–4 and remove the discharge grille and top access cover.

(3) Refer to figure 3–5 and remove the mist eliminator.

(4) Remove the condenser fan (para 3–24).

(5) Refer to figure 5–1 and remove the evaporator coil.

b. Installation.

(1) Install the evaporator coil in reverse order of removal.

(2) Pressure test, evacuate, and recharge the refrigerant system (para 6–5).

5–10. Condenser Coil

a. Removal.

(1) Discharge the refrigerant system (para 6–3).

(2) Remove the condenser fan (para 3–24).

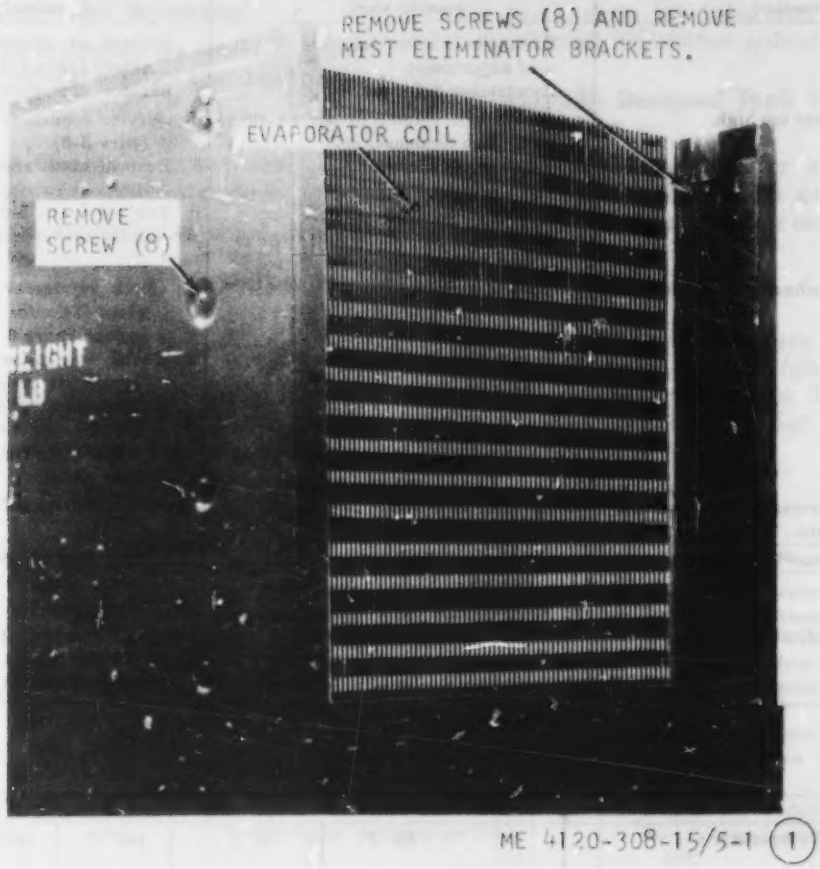


Figure 5–1. Evaporator coil, removal and installation.

(3) Refer to figure 3–4 and remove the condenser coil grille and screen.

(4) Remove the junction box (para 3–18).

(5) Remove the RF1 filter (para 3–18).

(6) Refer to figure 5–2 and remove the condenser coil.

b. Installation.

(1) Install the condenser coil in reverse order of removal. Refer to paragraph 6–3 for soldering procedures.

(2) Pressure test, evacuate, and recharge the refrigerant system (para 6–5).

5–11. Electric Heater

a. Removal.

(1) Refer to figure 3–4 and remove the top access cover.

(2) Refer to figure 5–3 and remove the electric heater.

b. Installation. Installation is the reverse of removal.

5–12. Sight Glass

a. Removal.

(1) Discharge the refrigerant system (para 6–3).

(2) Refer to figure 3–4 and remove the top access cover.

(3) Refer to figure 5–4 and remove the sight glass.

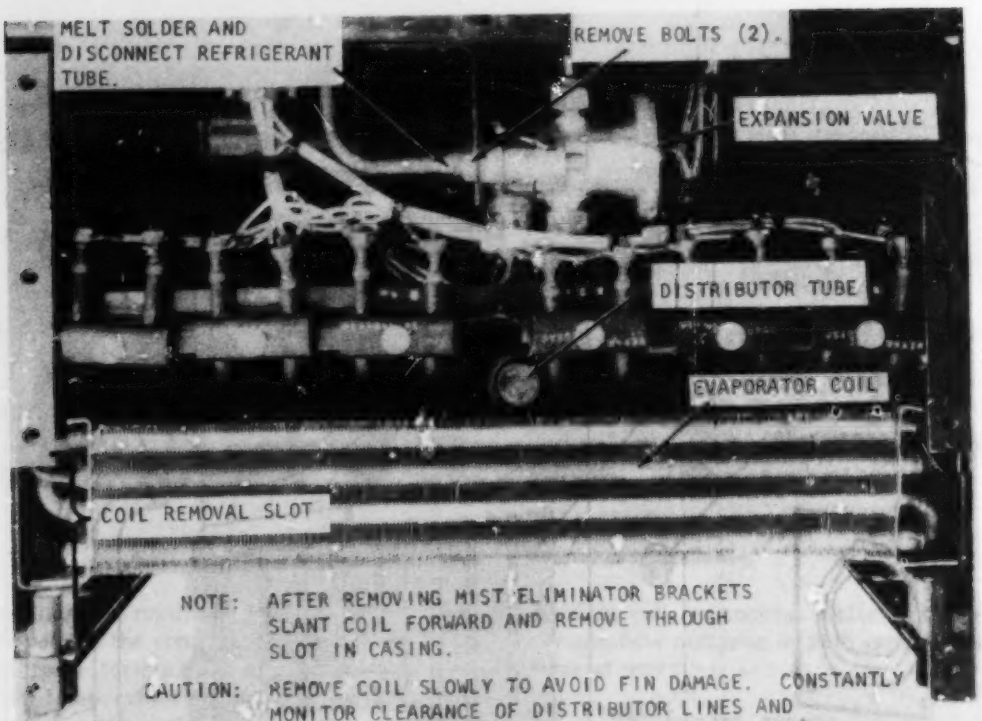
b. Installation.

(1) Install the sight glass in reverse order of removal. Refer to paragraph 6–3 for soldering procedures.

(2) Pressure test, evacuate, and recharge the refrigerant system (para 6–5).

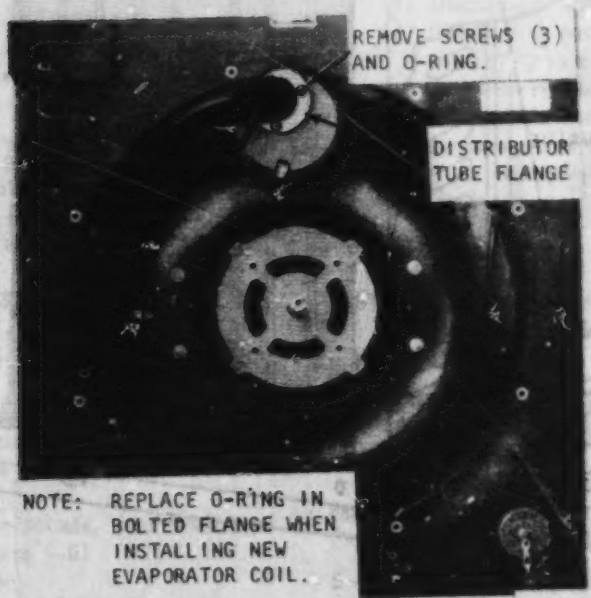
5–13. Regulating Valve

a. General. The pressure regulating valve is de-



NOTE: AFTER REMOVING MIST ELIMINATOR BRACKETS SLANT COIL FORWARD AND REMOVE THROUGH SLOT IN CASING.

CAUTION: REMOVE COIL SLOWLY TO AVOID FIN DAMAGE. CONSTANTLY MONITOR CLEARANCE OF DISTRIBUTOR LINES AND REFRIGERANT TUBES.



NOTE: REPLACE O-RING IN BOLTED FLANGE WHEN INSTALLING NEW EVAPORATOR COIL.

ME 4120-308-15/5-1 (2)

Figure 5-1—Continued.

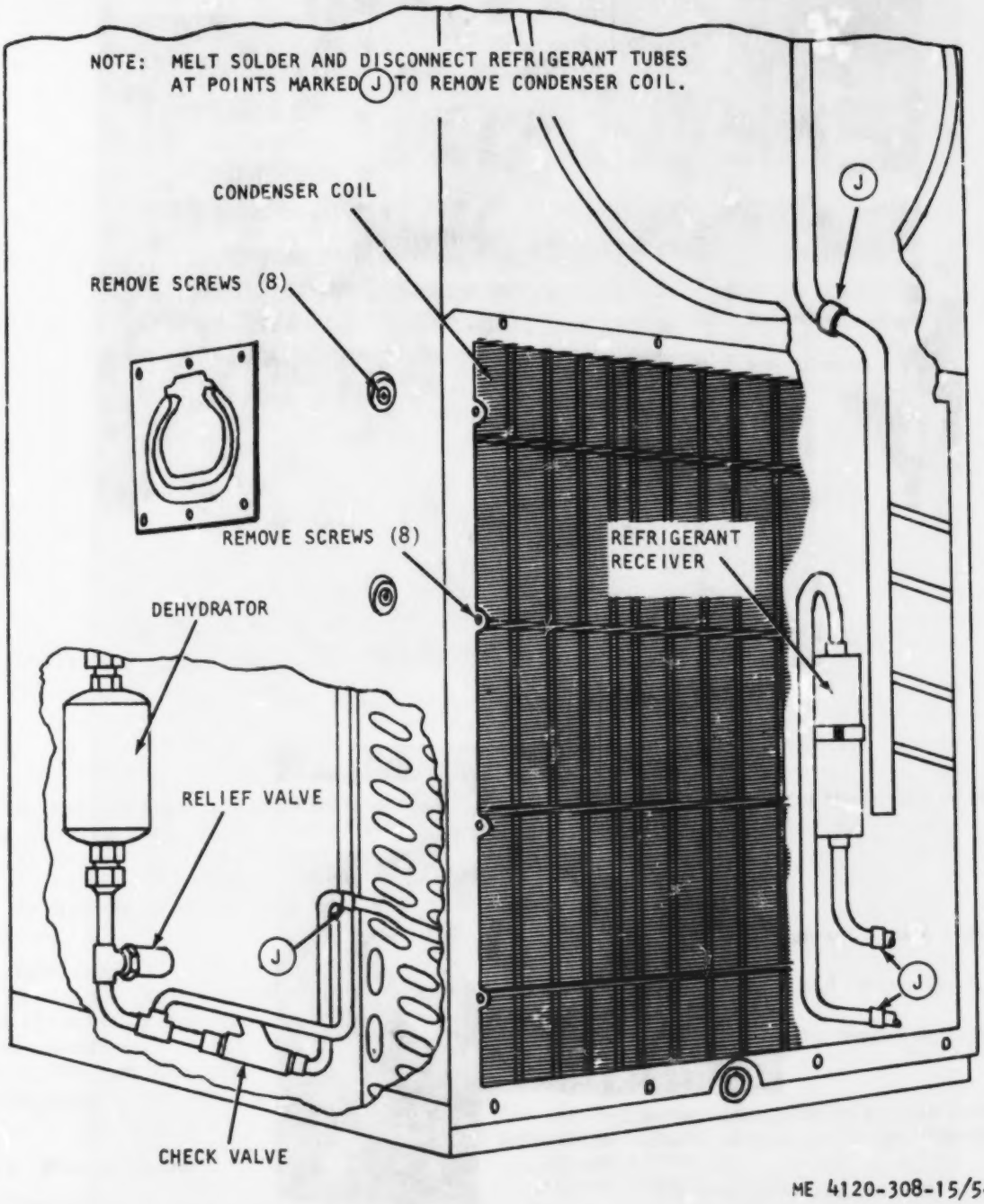


Figure 5-2. Condenser coil, removal and installation.

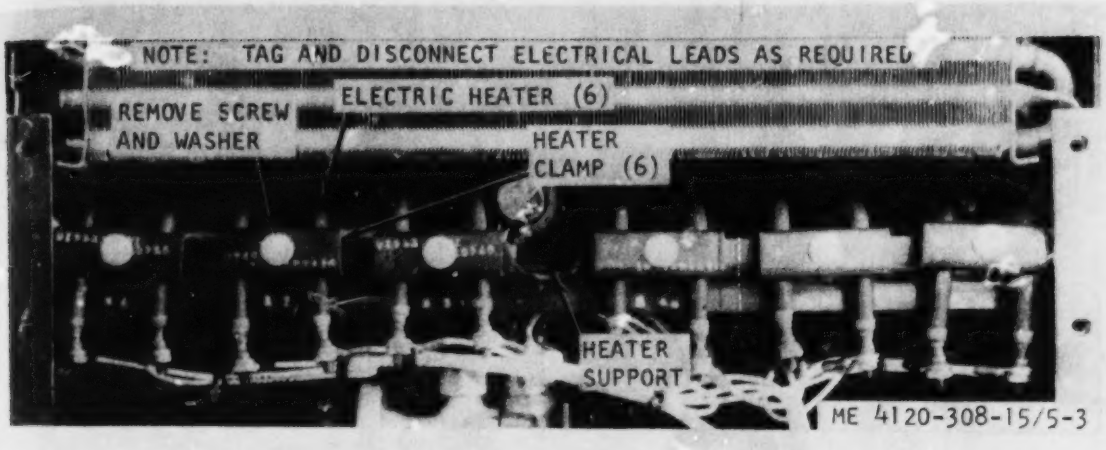


Figure 5–3. Electric heater, removal and installation.

signed to limit the minimum low side pressure to 58 (±2) psig at the compressor inlet line to prevent ice from forming on the evaporator coil during low temperature operation. Valve is preset to a pressure setting of 58(±2) psig.

b. Testing.

(1) Install refrigerant test pressure gages (para 6–6).

(2) With unit operating in the normal COOL mode, observe the suction pressure. Pressure should be a minimum of 56 psig.

(3) Restrict 90 percent of inlet evaporator airflow. If suction pressure drops below 56 psig, remove adjusting screw cap and turn counterclockwise until pressure reaches 56 psig. If a minimum pressure of 56 psig cannot be attained, valve is defective and should be replaced.

c. Removal.

(1) Discharge the refrigerant system (par 6–3).

(2) Refer to figure 3–4 and remove the top access cover.

(3) Refer to figure 5–5 and remove the regulating valve.

d. Installation.

(1) Install the regulating valve in reverse order of removal. Refer to paragraph 6–3 for soldering procedures.

(2) Pressure test, evacuate, and recharge the refrigerant system (para 6–5).

5–14. Compressor Bypass Solenoid Valve

a. General. The compressor bypass solenoid valve is a normally open solenoid valve installed in the system to stop the flow of liquid refrigerant to the evaporator coil when the thermostat does not call for cooling. Refer to figure 6–1 for normal flow patterns in both cooling and bypass mode of operation.

b. Testing.

(1) Remove the junction box (para 3–30).

(2) Start the air conditioner (para 2–8). If the solenoid valve fails to click upon start of operation, stop the unit and check the electrical connection and coils.

(3) Disconnect the electrical connector.

(4) Check for continuity between the coil leads. If continuity is not indicated, coil is defective and should be replaced.

(5) Check for continuity between the air conditioner casing and either of the coil leads. If continuity is indicated, coil is defective and should be replaced.

c. Removal.

(1) Discharge the refrigerant system (para 6–3).

(2) Refer to figure 5–6 and remove the compressor bypass solenoid valve.

d. Installation.

(1) Install the solenoid valve in reverse order of removal.

(2) Pressure test, evacuate and recharge the refrigerant system (para 6–5).

5–15. Pressure Equalizer Solenoid Valve

a. General. The pressure equalizer solenoid valve is a normally open solenoid valve installed in the system to insure rapid pressure equalization during the compressor off cycle. The valve is normally open during the compressor off cycle.

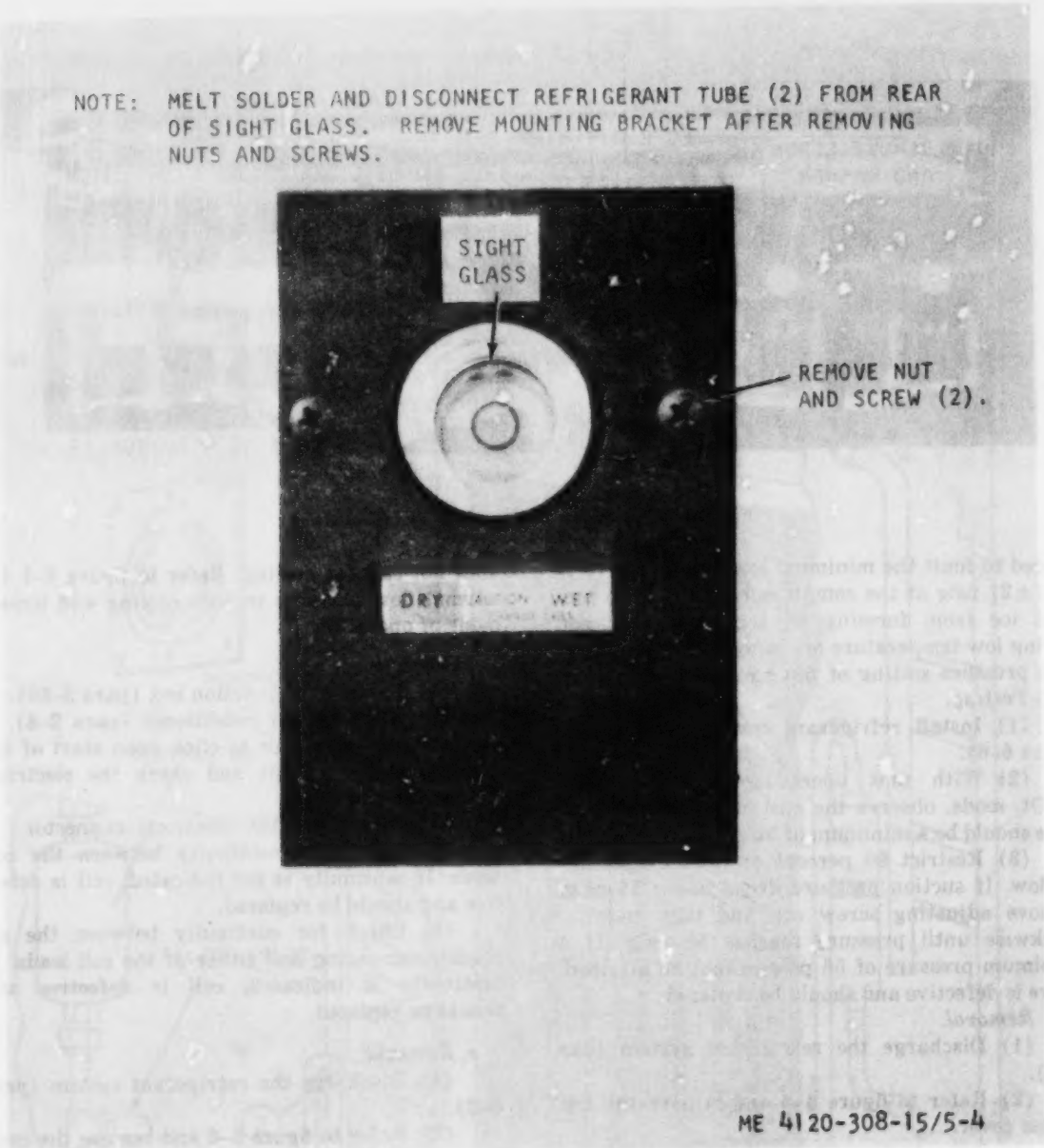

NOTE: MELT SOLDER AND DISCONNECT REFRIGERANT TUBE (2) FROM REAR OF SIGHT GLASS. REMOVE MOUNTING BRACKET AFTER REMOVING NUTS AND SCREWS.
SIGHT GLASS
REMOVE NUT AND SCREW (2).
DRY
WET
ME 4120-308-15/5-4

Figure 5-4. Sight glass, removal and installation.

b. Testing.

(1) Refer to figure 3–4 and remove the top access cover.

(2) Refer to figure 5–11 and remove the four screws attaching the high-and low-pressure cutout switch enclosure to the casing. Swing enclosure upward to allow access to solenoid valve.

Caution: **When swinging enclosure up be especially careful not to kink or pinch the high- and low-pressure cutout switch capillary tubes extending from the enclosure.**

(3) Start the air conditioner (para 2–8). In the bypass mode of operation of tubing from the discharge side of valve (as indicated by arrow on valve body) should become warm immediately. If not, stop the unit and check the electrical connection and solenoid valve coil (para 5–14). If the valve fails to click upon start of the bypass mode

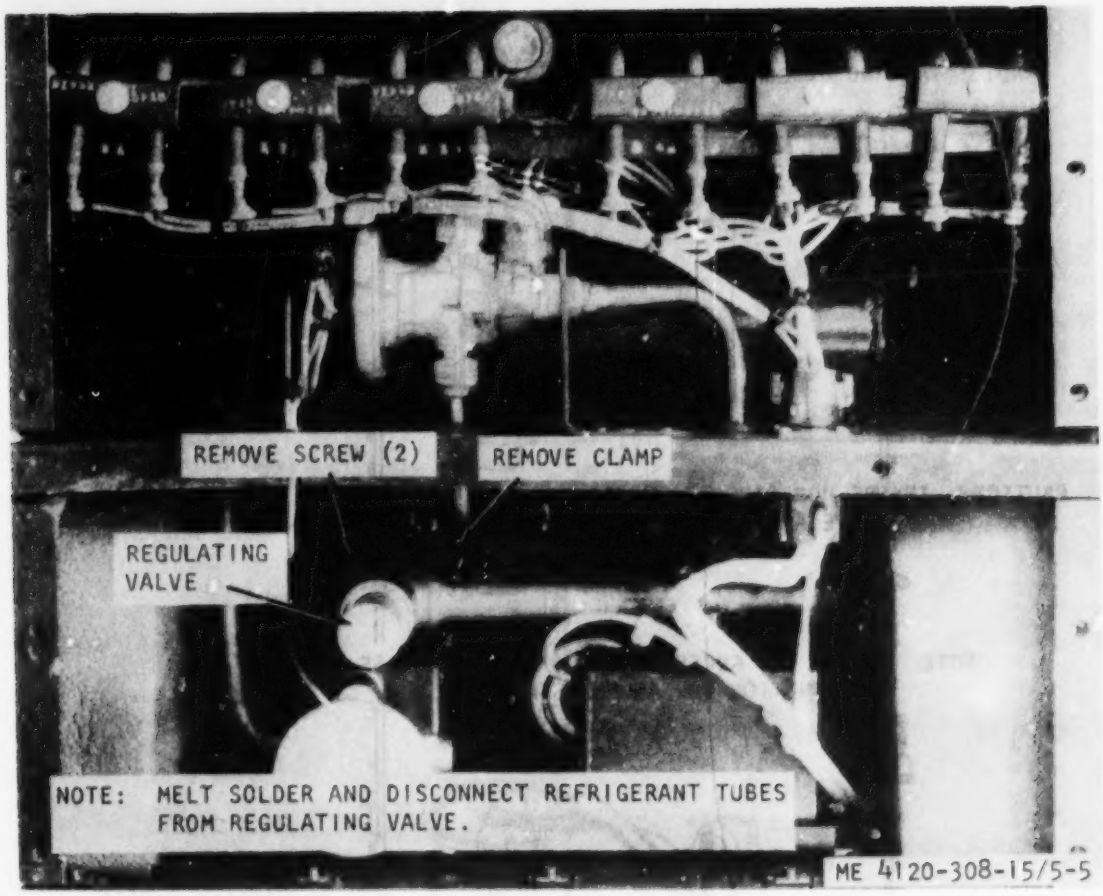


Figure 5–5. Regulating valve, removal and installation.

of operation, stop the unit and check the electrical connection and solenoid valve coil (para 5–14).

c. Removal.

(1) Discharge the refrigerant system (para 6–3).

(2) Refer to figure 5–6 and remove the pressure equalizer solenoid valve.

d. Installation.

(1) Install the solenoid valve in reverse order of removal.

(2) Pressure test, evacuate, and recharge the refrigerant system (para 6–5).

5–16. Compressor Bypass and Pressure Equalizer Solenoid Valve Repair

a. Disassembly.

(1) Refer to figure 5–7 and disassemble the compressor bypass or the pressure equalizer solenoid valve.

(2) Inspect all metal parts for cracks or other damage. Replace a defective solenoid valve.

(3) Replace a defective or damaged coil.

(4) Replace a defective or damaged diaphragm and bonnet assembly.

b. Assembly.

(1) Assemble the compressor bypass or the pressure equalizer solenoid valve in reverse order of disassembly.

(2) Install solenoid valve in body on air conditioner (fig. 5–6).

Caution. **Insure O-ring is properly positioned between body of valve and bonnet assembly when installing.**

5–17. Evaporator Expansion Valve

a. General. The evaporator expansion valve controls the rate of flow of liquid refrigerant into

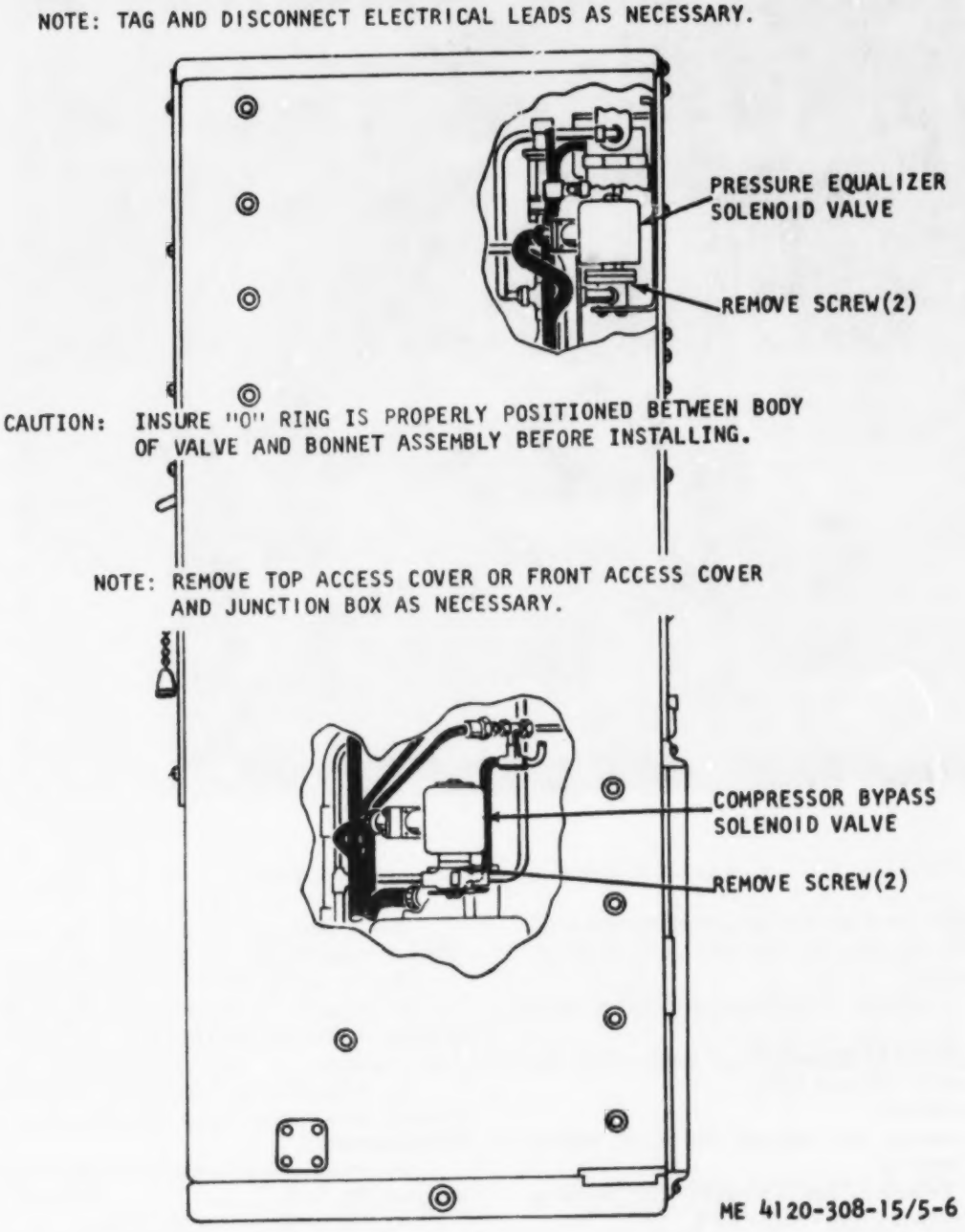

NOTE: TAG AND DISCONNECT ELECTRICAL LEADS AS NECESSARY.
PRESSURE EQUALIZER SOLENOID VALVE
REMOVE SCREW(2)
CAUTION: INSURE "O" RING IS PROPERLY POSITIONED BETWEEN BODY OF VALVE AND BONNET ASSEMBLY BEFORE INSTALLING.
NOTE: REMOVE TOP ACCESS COVER OR FRONT ACCESS COVER AND JUNCTION BOX AS NECESSARY.
COMPRESSOR BYPASS SOLENOID VALVE
REMOVE SCREW(2)
ME 4120-308-15/5-6

Figure 5–6. Compressor bypass and pressure equalizer solenoid valve, removal and installation.

the evaporator coil during the cooling cycle of operation. This valve has an external superheat adjustment, factory adjusted at 6 (±1.5) °F. Access to the expansion valve is through the top access cover.

b. Removal.

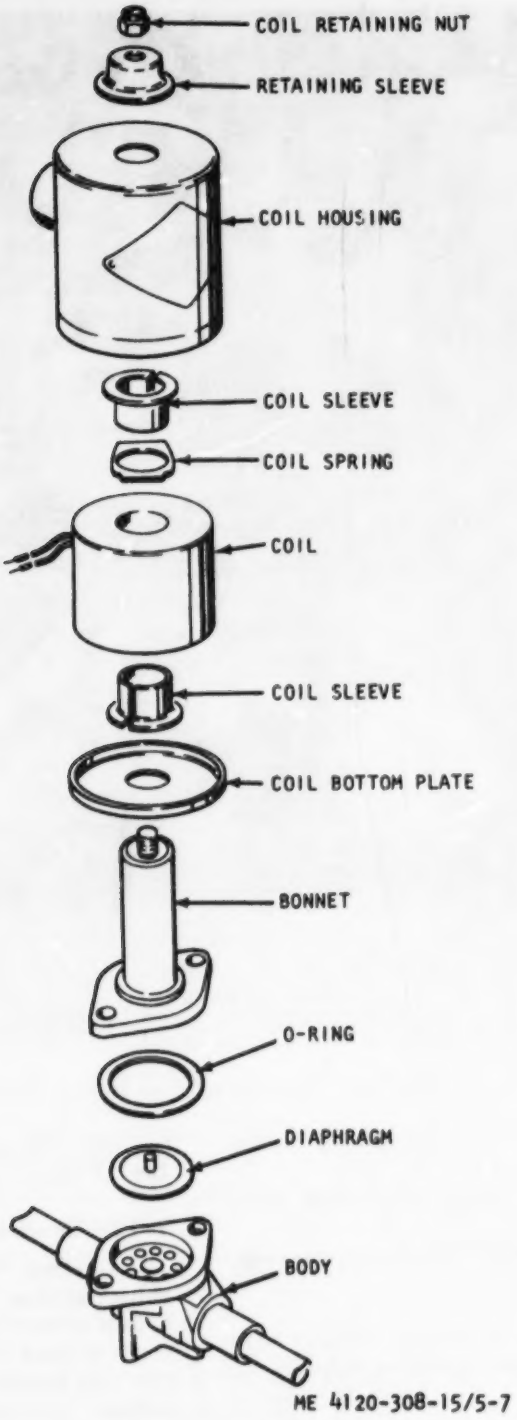


Figure 5-7. Solenoid valve repair.

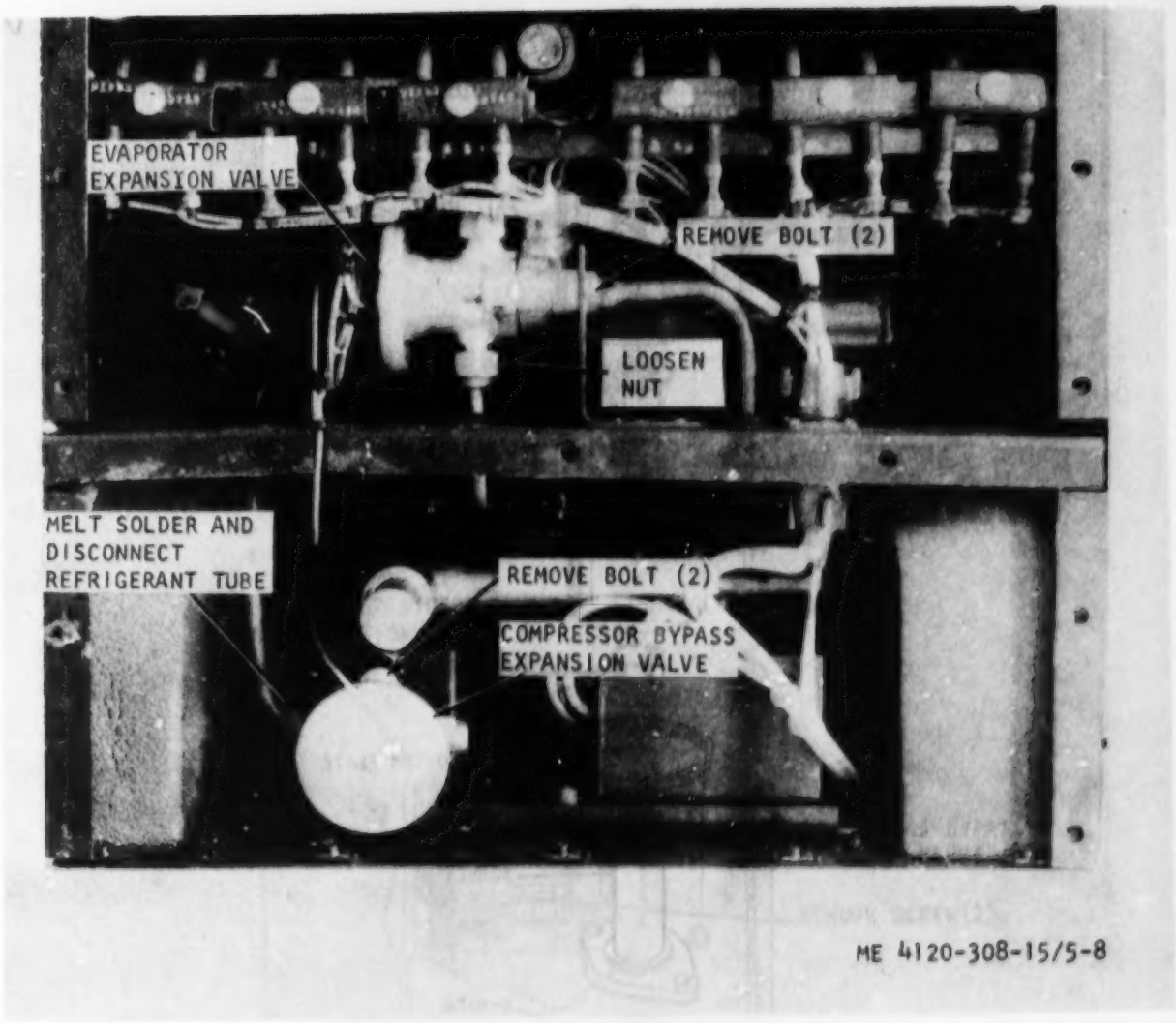


Figure 5–8. Expansion valve, removal and installation.

(1) Refer to figure 3–4 and remove the top access panel.

(2) Discharge the refrigerant system (para 6–3).

(3) Refer to figure 5–8 and remove the evaporator expansion valve.

c. Adjustment. Refer to figures 5–9 and 5–10 and adjust the evaporator expansion valve.

d. Installation.

(1) Install the expansion valve in reverse order of removal. Refer to paragraph 6–3 for soldering procedures.

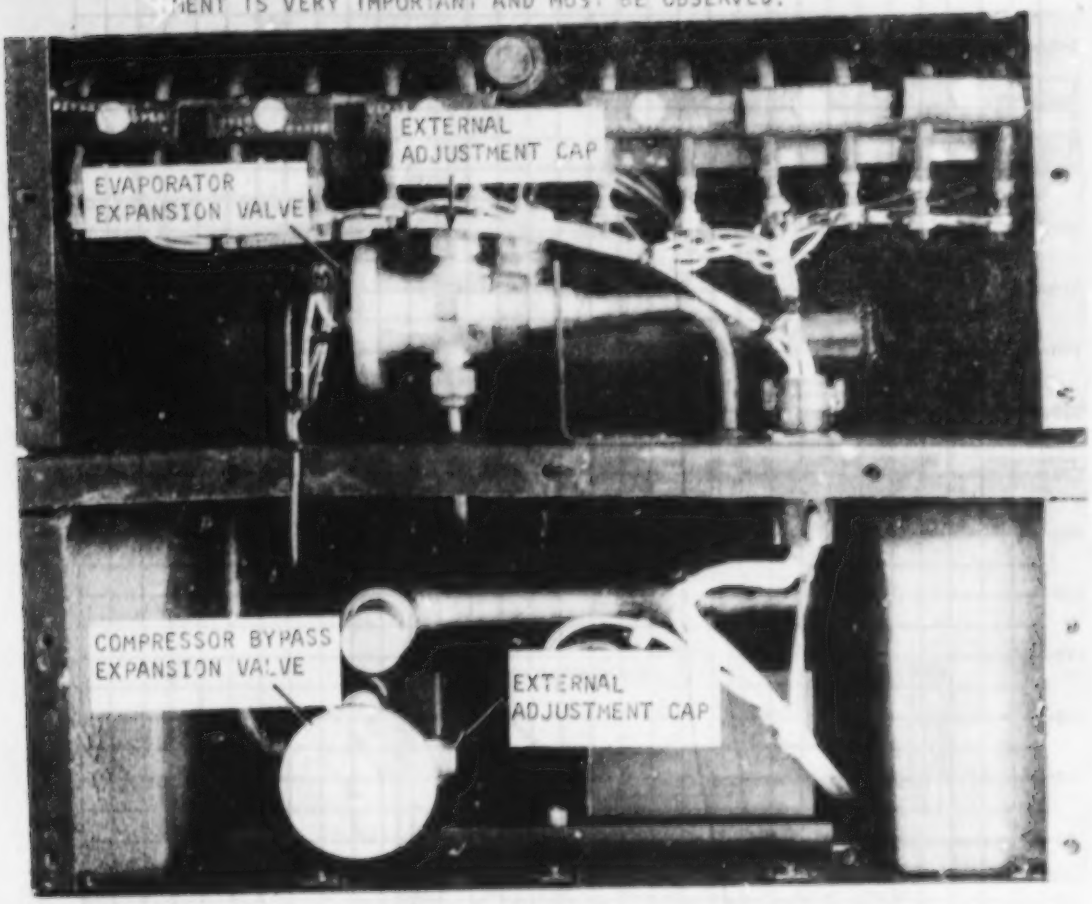
(2) Pressure test, evacuate, and recharge the refrigerant system (para 6–5).

5–18. Compressor Bypass Expansion Valve

a. General. The compressor bypass expansion valve functions when the air conditioner is in the bypass cycle of operation. The valve modulates a small amount of liquid refrigerant into the suction line tubing. This valve has an external superheat adjustment, factory adjusted at 15 (±1.5)° F. Access to the expansion valve is through the top access cover.

b. Removal.

CAUTION: NEVER ADJUST THE EXPANSION VALVE UNLESS IT IS ABSOLUTELY NECESSARY. WHEN ADJUSTING THE EXPANSION VALVE, ALLOW AT LEAST 20 MINUTES BETWEEN EACH ADJUSTMENT. THIS TIME ELEMENT IS VERY IMPORTANT AND MUST BE OBSERVED.



ADJUSTMENT:

STEP 1. TAPE THE BULB OF A THERMOMETER TO SUCTION TUBE NEAR SENSING ELEMENT. INSULATE THERMOMETER BULB.

STEP 2. INSTALL A SUITABLE PRESSURE GAGE AT SUCTION TUBE SERVICE VALVE.

STEP 3. OPERATE THE UNIT FOR APPROXIMATELY 30 MINUTES (THERMOMETER READING MUST STABILIZE).

STEP 4. CHECK THERMOMETER AND PRESSURE GAGE READINGS. COMPARE READINGS WITH FIGURE 5-10 THERMOMETER READING SHOULD BE APPROXIMATELY 10°F HIGHER THAN TEMPERATURE GIVEN ON FIGURE.

STEP 5. REMOVE CAP AND TURN ADJUSTING SCREW TWO TURNS CLOCKWISE TO INCREASE SUPERHEAT 1°F OR TWO TURNS COUNTERCLOCKWISE TO DECREASE SUPERHEAT. INSTALL CAP.

NOTE: FACTORY SET SUPERHEATS ARE:
EVAPORATOR EXPANSION VALVE, 6(±1.5)°F.
COMPRESSOR BYPASS EXPANSION VALVE, 25(±1.5)°F.

ME 4120-308-15/5-9

Figure 5-9. Expansion valve adjustment.

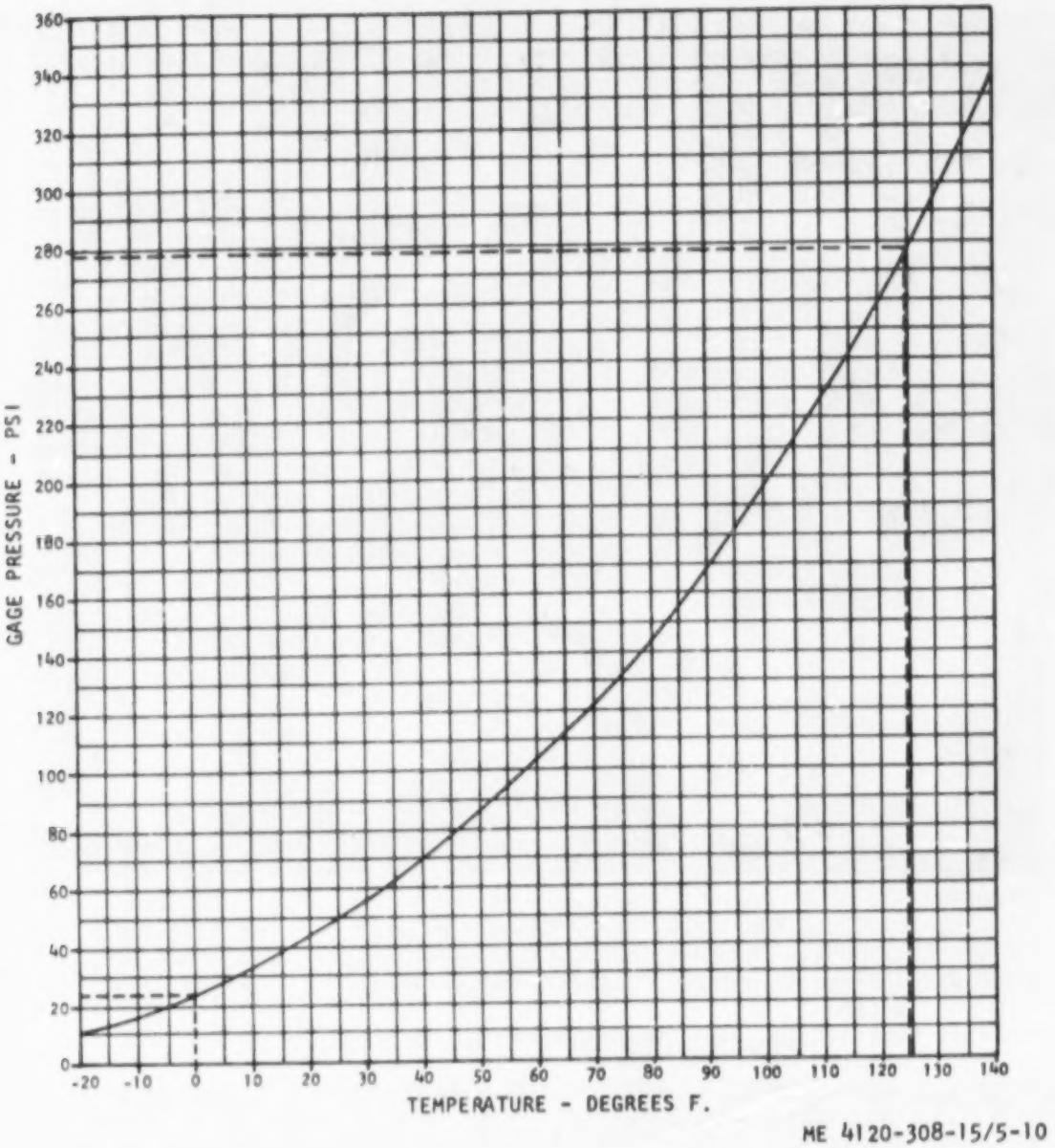


Figure 5–10. Pressure-temperature curve for refrigerant R–22.

(1) Refer to figure 3–4 and remove the top access panel.

(2) Discharge the refrigerant system (para 6–3).

(3) Refer to figure 5–8 and remove the compressor bypass expansion valve.

c. Adjustment. Refer to figures 5–9 and 5–10 and adjust the evaporator expansion valve.

5–19. High-Pressure Cutout Switch

a. Testing.

(1) Restrict the condenser airflow by blocking the condenser inlet.

(2) Install suction and discharge service gauges.

(3) Operate the air conditioner in the cool-

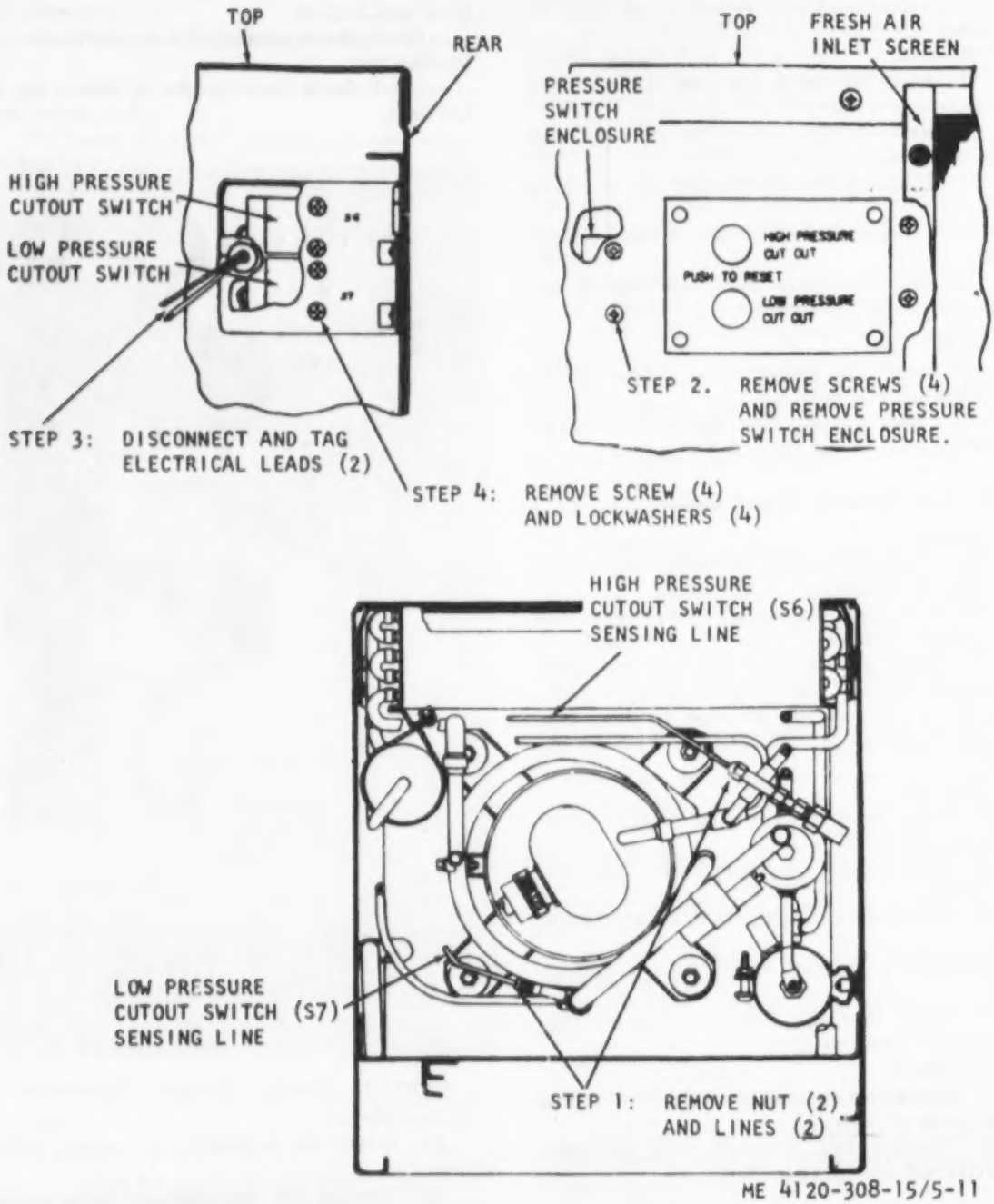


Figure 5–11. High- and low-pressure cutout switch.

ing mode until the high-pressure cutout switch cuts out. Switch should cutout at 445 (±10) psig. If not, switch is defective and must be replaced.

(4) Check for continuity between terminals of pressure switch. Continuity should be indicated. If continuity is not indicated, the high-pressure cutout switch is defective and must be replaced.

b. Removal.

(1) Refer to figure 3–4 and remove front and top access covers.

(2) Refer to figure 3–6 and remove fresh air inlet screen.

(3) Discharge the refrigerant system (para 6–3).

(4) Refer to figure 3–10 and remove control panel.

(5) Refer to figure 5–11 and remove the high-pressure cutout switch.

c. Installation.

(1) Install the high-pressure cutout switch in reverse order of removal.

(2) Pressure test, evacuate, and recharge the refrigerant system (para 6–5).

5–20. Low-Pressure Cutout Switch

a. Testing.

(1) Verify refrigerant pressure is above cutout pressure setting of 7 (±5) psig.

(2) Push reset button. If switch does not reset, switch is defective and must be replaced.

(3) Check for continuity between terminals of pressure switch. Continuity should be indicated. If continuity is not indicated, the low-pressure cutout switch is defective and must be replaced.

b. Removal.

(1) Refer to figure 3–4 and remove front and top access covers.

(2) Refer to figure 3–6 and remove fresh air inlet screen.

(3) Discharge the refrigerant system (para 6–3).

(4) Refer to figure 3–10 and remove control panel.

(5) Refer to figure 5–11 and remove the low-pressure cutout switch.

c. Installation.

(1) Install the low-pressure cutout switch in reverse order of removal.

(2) Pressure test, evacuate, and recharge the refrigerant system (para 6–5).

5–21. Dehydrator

a. General. The dehydrator removes moisture and contaminants from the refrigerant circuit. The dehydrator must be replaced whenever the system is opened for repairs.

b. Removal.

(1) Discharge the refrigerant system (para 6–5).

(2) Refer to figure 3–4 and remove the lower front access cover.

(3) Refer to paragraph 3–30 and remove the junction box.

(4) Refer to figure 5–12 and remove the dehydrator.

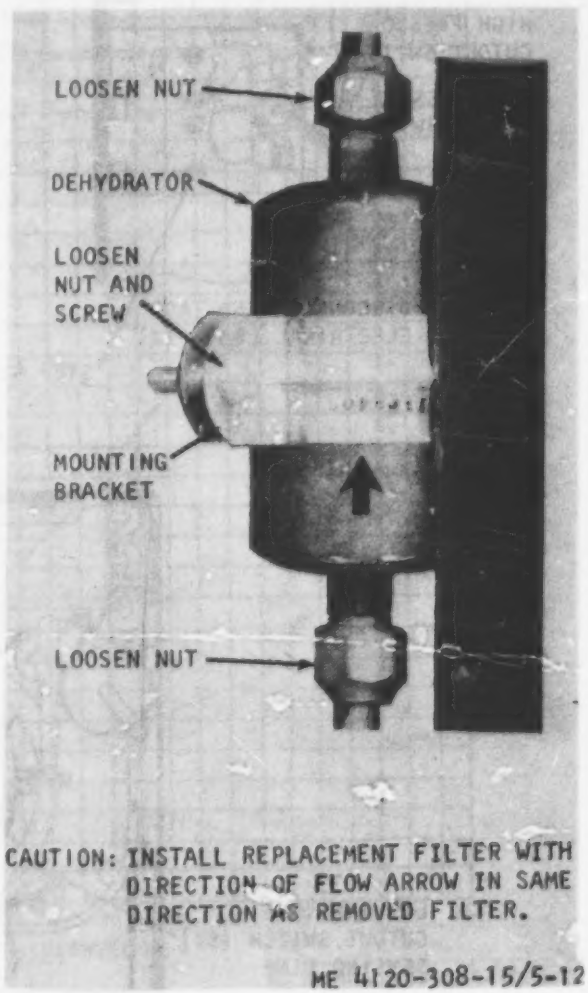

LOOSEN NUT
DEHYDRATOR
LOOSEN NUT AND SCREW
MOUNTING BRACKET
LOOSEN NUT
CAUTION: INSTALL REPLACEMENT FILTER WITH DIRECTION OF FLOW ARROW IN SAME DIRECTION AS REMOVED FILTER.
ME 4120-308-15/5-12

Figure 5–12. Dehydrator, removal and installation.

c. Installation.

(1) Install the dehydrator in reverse order of removal.

(2) Pressure test, evacuate, and recharge the refrigerant system (para 6–5).

5–22. Pressure Relief Valve

a. General. The pressure relief valve is installed in the system to relieve the refrigerant system pressure in the event the high-pressure cutout

switch fails to stop the refrigerant compressor. The relief valve is preset to open at 540 (±10%) psig.

b. Removal.

(1) Discharge the refrigerant system (para 6–3).

(2) Refer to figure 3–4 and remove the lower front access cover.

(3) Refer to paragraph 3–30 and remove the junction box.

(4) Refer to figure 5–13 and remove the pressure relief valve.

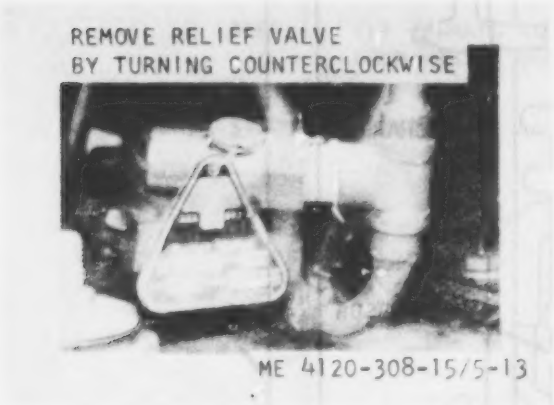


Figure 5–13. Pressure relief valve, removal and installation.

c. Installation.

(1) Install the pressure relief valve in reverse order of removal.

(2) Pressure test, evacuate, and recharge the refrigerant system (para 6–5).

5–23. Compressor

a. Removal.

(1) Refer to figure 3–4 and remove the lower front access cover.

(2) Refer to paragraph 3–30 and remove the junction box.

(3) Discharge the refrigerant system (para 6–3).

(4) Refer to figure 5–14 and remove the compressor.

b. Testing.

(1) Check for continuity between pins A and B, B and C, and C and A of the compressor electrical receptacle. There should be continuity in each check.

(2) Check for continuity between pins A, B, and C, and the compressor housing. There should be no continuity.

(3) Check for continuity between pins D and E. Continuity should exist. If compressor inherent thermostat is open, allow compressor to cool and recheck for continuity. If open, replace compressor.

(4) Check cold resistance tolerances at terminals A and B, B and C, and C and A of compressor (B1) (fig. 1–4). Resistance at each terminal should be 1.3 (±0.5) ohms.

(5) Check amperage draw in phase A, B, and C at inlet power supply cable, prior to input power receptacle connector (J11) with two speed fan selector switch in HI-SPEED position. Amperage draw at each phase should be 12 (±2) amperes.

c. Installation.

(1) Install the compressor in reverse order of removal. Refer to paragraph 6–3 for soldering procedures.

(2) Pressure test, evacuate, and recharge the refrigerant system (para 6–5).

(3) Install the junction box and lower front panel in reverse order of removal.

5–24. Pressure Switch

a. General. The pressure switch is installed to sense compressor discharge pressure. When the air conditioner is operated with the fan switch in the LO–SPEED position, an increase in compressor discharge pressure to 400 (±16) psig will actuate the normally open pressure switch (S3), causing the switch to close and the fan speed to increase to HI-SPEED. When the discharge pressure drops to 350 (±16) psig, the pressure switch (S3) contacts will return to normally open and the fan speed will return to LO-SPEED.

b. Testing. Check for continuity between terminals 2 of fuse block (XF2) and X2 of armature relay (K4). Continuity should not be indicated. If continuity is indicated, switch is defective and must be replaced.

c. Removal. Refer to figure 5–15 and remove the pressure switch.

d. Installation. Installation is the reverse of removal.

5–25. Refrigerant Compressor Mounts

a. Removal. The compressor mounts are removed during removal of the refrigerant compressor (para 5–23).

b. Installation. Installation is the reverse of removal.

5–26. Base Assembly and Casing Assembly

a. Removal. Refer to figure 5–16 and remove the casing assembly from the base assembly.

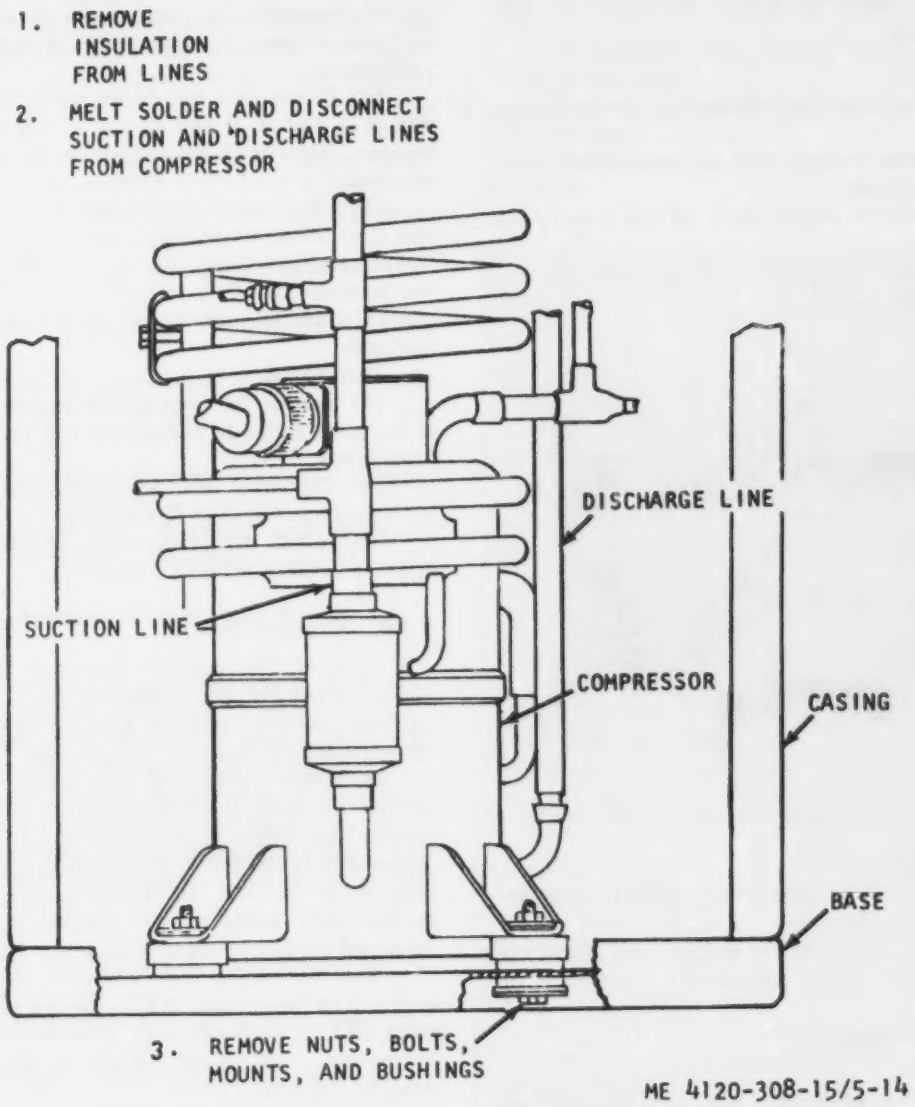


Figure 5–14. Compressor, removal and installation.

b. Installation. Installation is the reverse of removal.

5–27. Tubing

Refer to paragraph 6–3 and replace any defective tubing with tubing of the same length, size, shape, and material. Following replacement, pressure test, evacuate, and recharge the refrigerant system (para 6–5).

Caution: **If the refrigerant system is opened to the atmosphere the dehydrator must be replaced.**

5–28. Check Valve

a. General. The check valve is installed in the system to prevent liquid refrigerant from flowing from the accumulator tanks to the compressor discharge valves during compressor off-cycle periods. The check valve is normally closed and opens at a 0.5 psig pressure differential.

b. Testing.

(1) Install pressure gauges (para 6–6).

(2) Operate air conditioner in cooling mode.

(3) Check pressure gauges for high discharge pressure and low suction pressure. This is

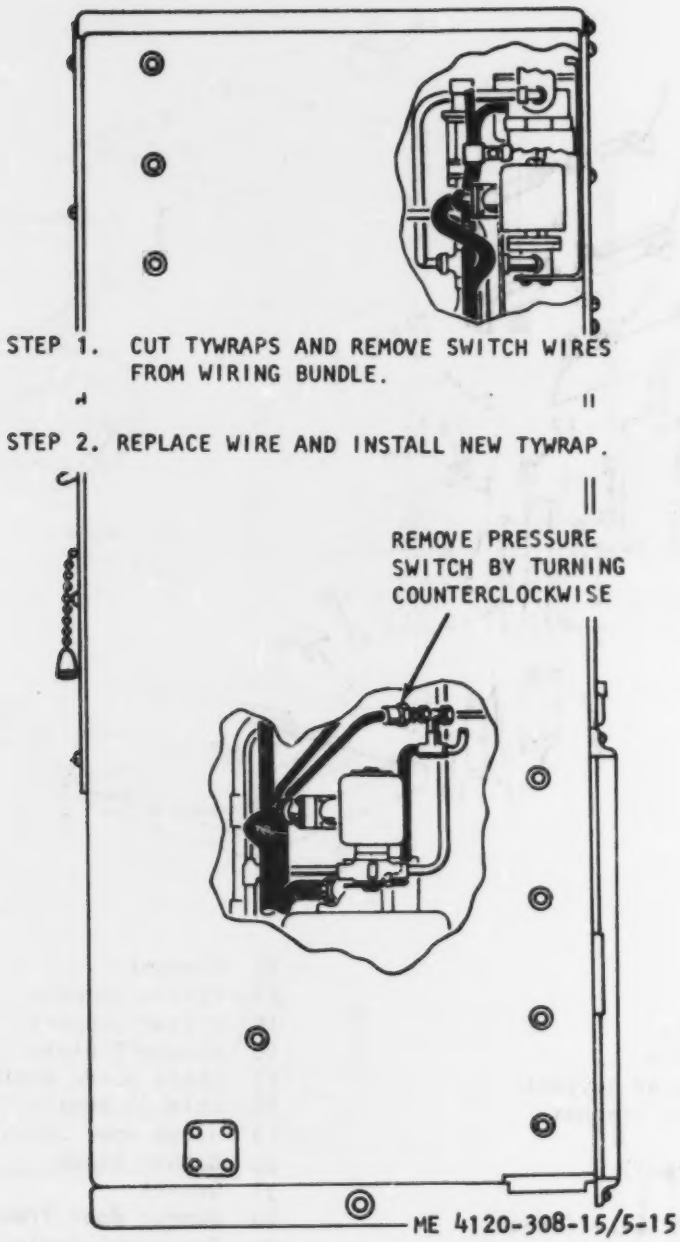

STEP 1. CUT TYWRAPS AND REMOVE SWITCH WIRES FROM WIRING BUNDLE.
STEP 2. REPLACE WIRE AND INSTALL NEW TYWRAP.
REMOVE PRESSURE SWITCH BY TURNING COUNTERCLOCKWISE
ME 4120-308-15/5-15

Figure 5–15. Pressure switch, removal and installation.

an indication of a stuck closed check valve. Replace the defective check valve.

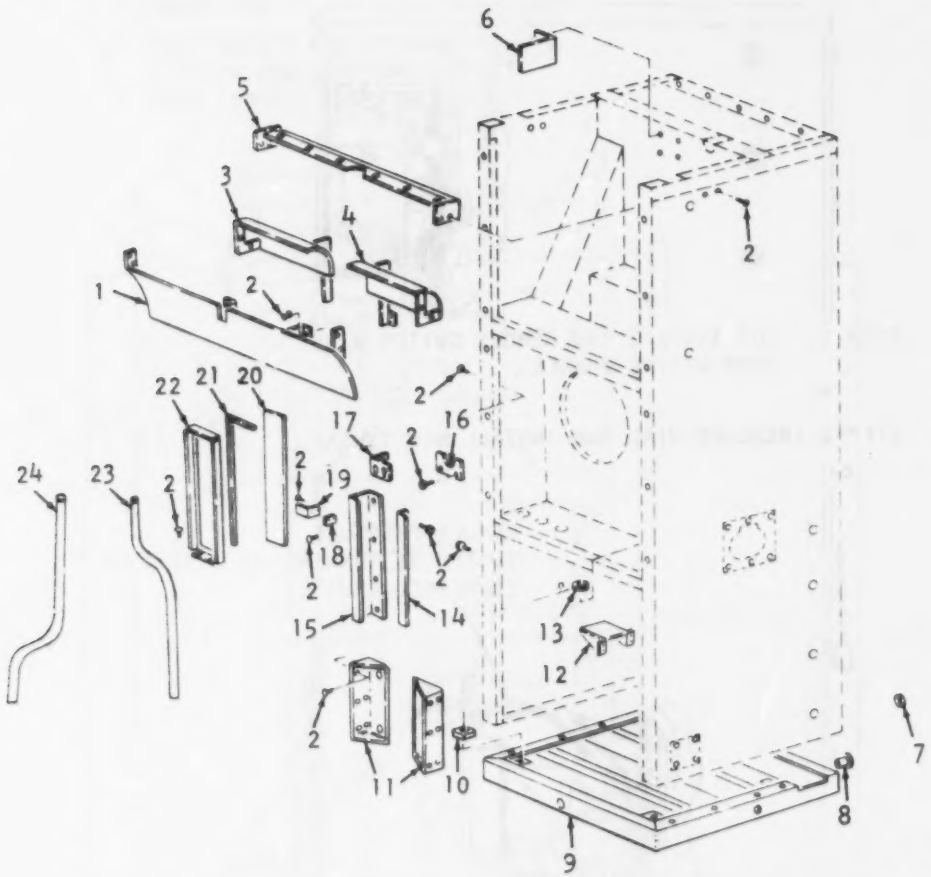
c. Removal.

(1) Discharge the refrigerant system (para 4–3).

(2) Refer to figure 3–4 and remove the lower front access cover.

(3) Refer to paragraph 3–30 and remove the junction box.

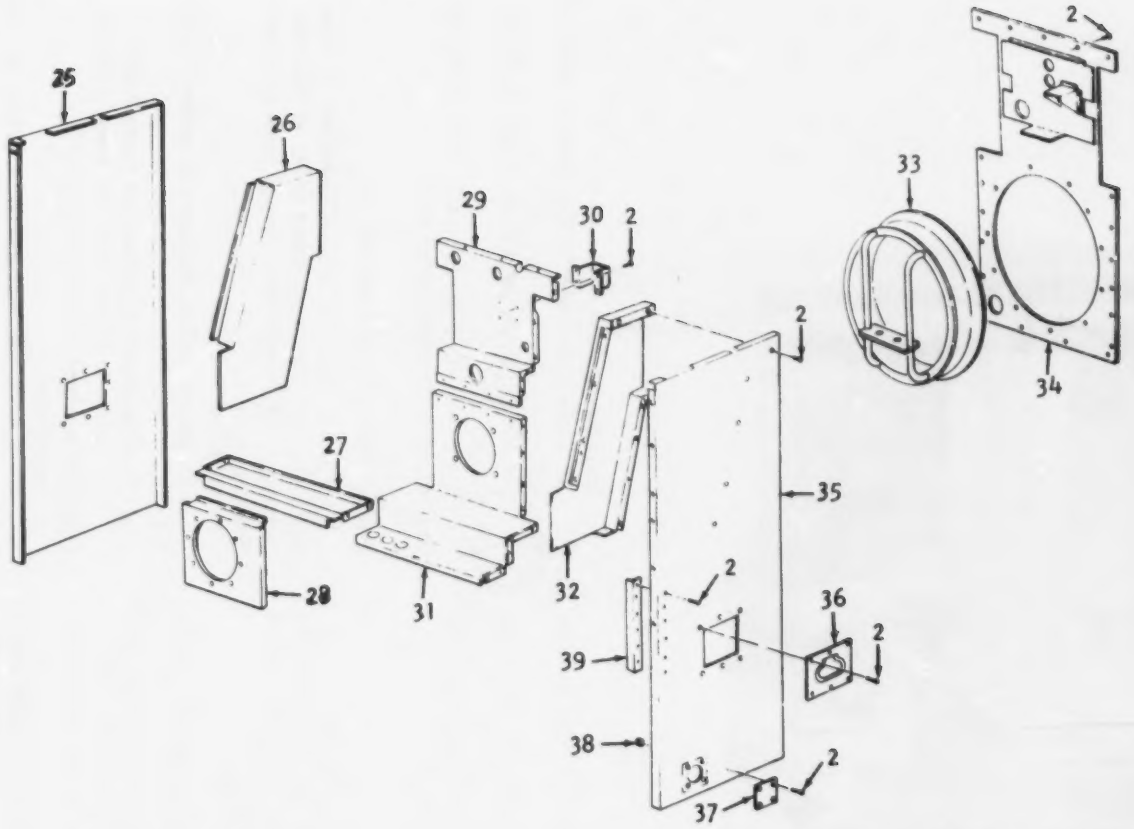
(4) Refer to figure 5–17 and remove the check valve.



1 Lower baffle
2 Pop rivet
3 Top left baffle
4 Top right baffle
5 Evaporator heater support
6 Expansion valve bracket
7 Drain plug
8 Rivet nut (4 reqd)
9 Base
10 Nut, square, 7/16-14 (4reqd)
11 Control box support (2 reqd)
12 Compressor solencid bypass valve bracket
13 Grommet
14 Filter support
15 Filter support
16 Blockoff plate
17 Chain guide angle
18 Shim (4 reqd)
19 Hinge door spring (2 reqd)
20 Damper blade
21 Gasket
22 Damper door frame
23 Top right drain tube
24 Top left drain tube

ME 4120-308-15/5-16 (1)

Figure 5-16. Base, casing, and duct, removal and installation.



25 Left side panel
26 Left duct
27 Drain pan
28 Intake panel
29 Top partition panel
30 Pressure regulator valve bracket
31 Partition panel
32 Right duct
33 Motor support and cone assembly
34 Back panel
35 Right side panel
36 Handle (2 reqd)
37 Blockoff plate
38 Nut
39 Filter support

ME 4120-308-15/5-16 (2)

Figure 5-16—Continued.

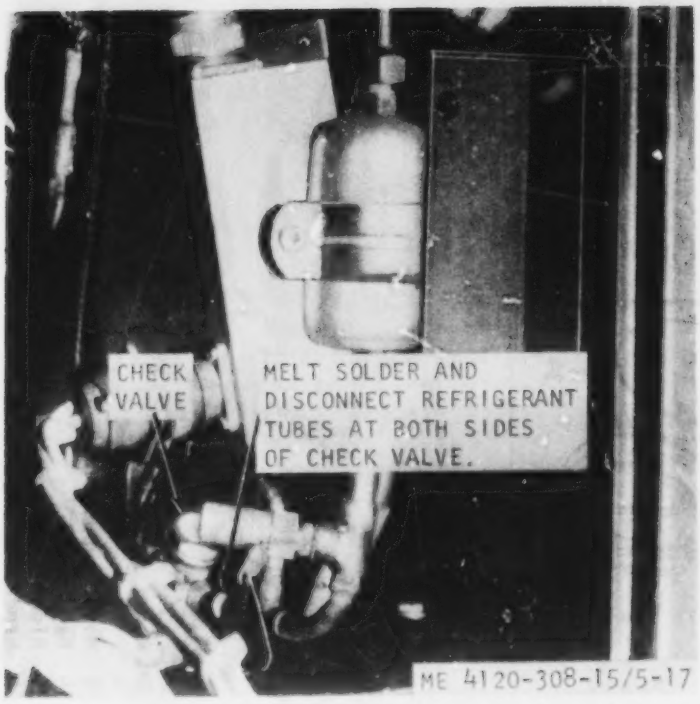


Figure 5–17. Check valve, removal and installation.

d. Installation.

(1) Install the check valve in the reverse order of removal.

(2) Refer to paragraph 6–3 for soldering procedures.

(3) Pressure test, evacuate, and recharge the refrigerant system (para 6–5).

5–29. Accumulator Tanks

a. General. The accumulator tanks are installed in the system to permit low ambient temperature operation by supplying additional liquid refrigerant to the evaporator coil.

b. Removal.

(1) Discharge the refrigerant system (para 6–3).

(2) Refer to figure 3–4 and remove the top access cover.

(3) Refer to paragraph 5–17 and remove the evaporator expansion valve.

(4) Remove the evaporator expansion valve bracket from the top partition panel (fig. 5–16).

(5) Disconnect electrical heater element plug at top partition panel (fig. 5–18).

(6) Refer to figure 5–18 and remove the tank.

c. Installation.

(1) Install the tank in the reverse order of removal.

(2) Refer to paragraph 6–3 for soldering procedures.

(3) Pressure test, evacuate, and recharge the refrigerant system (para 6–5).

5–30. Refrigerant Receiver

a. General. The refrigerant receiver is connected to the inlet and outlet lines of the condenser coil and serves as a storage tank for liquid refrigerant.

b. Removal.

(1) Discharge the refrigerant system (para 6–3).

(2) Remove the junction box (para 3–24).

(3) Refer to figure 5–19 and remove the refrigerant receiver.

c. Installation.

(1) Install the refrigerant receiver in the reverse order of removal.

(2) Refer to paragraph 6–3 for soldering procedures.

(3) Pressure test, evacuate, and recharge the refrigerant system (para 6–5).

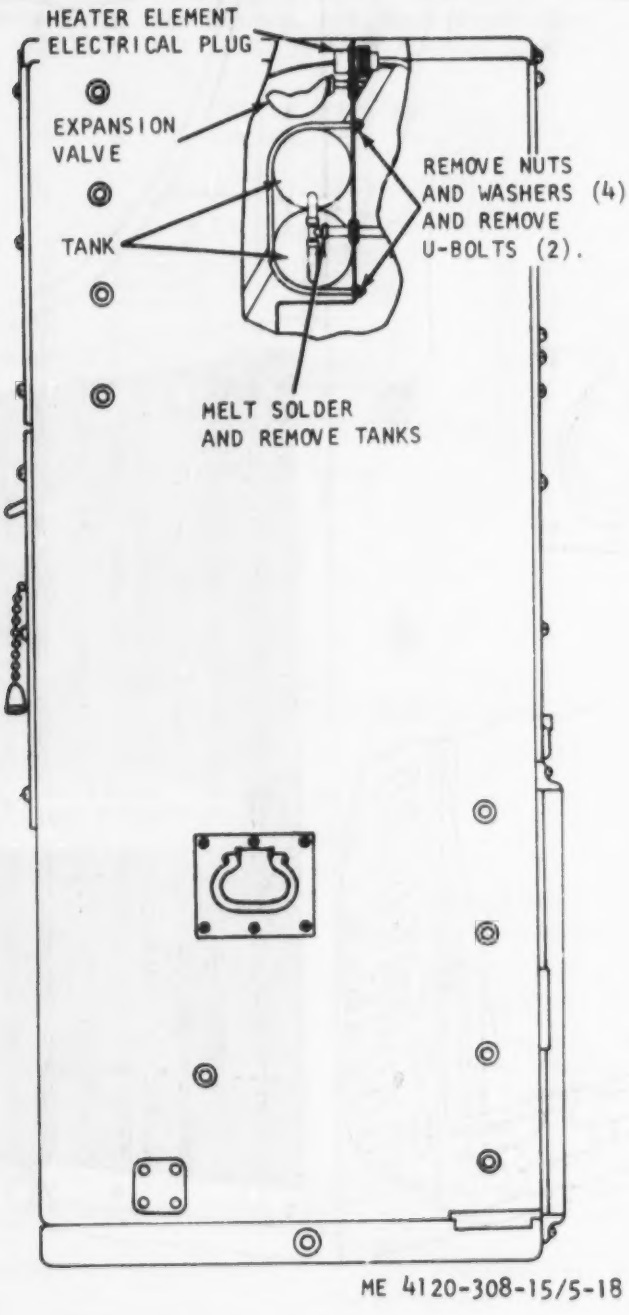


Figure 5–18. Accumulator tank, removal and installation.

5–31. Subcooler

a. General. The subcooler, an integral part of the condenser coil, is installed in the system to subcool the warm liquid refrigerant leaving the receiver prior to flowing through the check valve.

b. Removal and Installation. Refer to paragraph 5–10 and remove and replace the condenser coil.

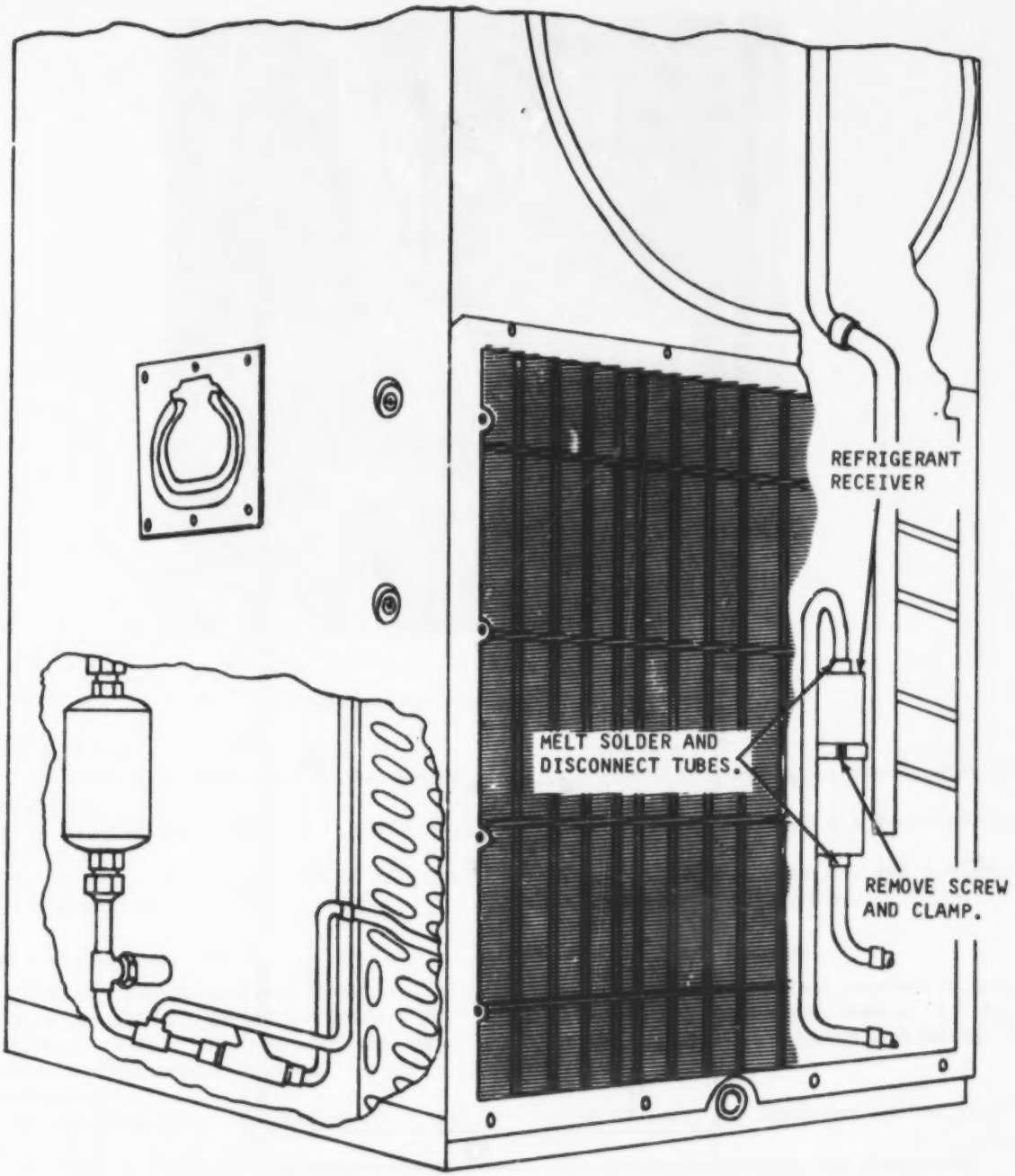


Figure 5–19. Refrigerant receiver, removal and installation.

5–32. Service Valves

a. General. The service valves (suction and discharge), located behind the fresh air inlet screen and mounted in the fresh air inlet duct, provide the mechanic a suitable connection point for drawing refrigerant from the system, charging the system with refrigerant, pressurizing the system for leak testing, purging the system with

NOTE: TO REMOVE VALVE CORE, REMOVE CAPS, AND REMOVE CORES WITH A STANDARD VALVE CORE REMOVAL TOOL BY TURNING COUNTER-CLOCKWISE. INSTALL CORES WITH TOOL BY TURNING CLOCKWISE.

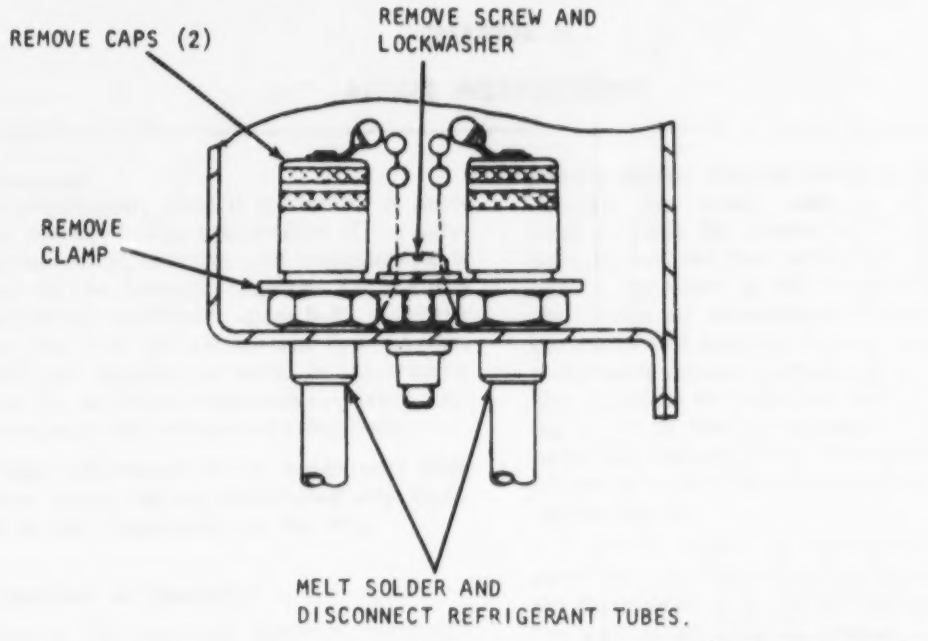


Figure 5–20. Service valves.

nitrogen when making repairs, pulling a vacuum on the system and system operating pressure tests. The valves have a removable core. A hose with valve core depressor must be used when servicing, purging, pulling a vacuum or when connecting gauges for system operating pressure tests.

b. Removal.

(1) Refer to figure 3–6 and remove the fresh air inlet screen.

(2) Refer to paragraph 3–24 and remove the condenser fan.

(3) Discharge the refrigerant system (para 6–3).

(4) Refer to figure 5–20 and remove the suction and discharge service valves.

c. Repair. The service valves are repaired by replacing the valve core. Refer to figure 5–20.

Note. The valve cores can be removed wthout removing the valves. Discharge the refrigerant system (para 6–3) before removing and replacing valve cores.

d. Installation.

(1) Install the service valves in reverse order of removal.

(2) Refer to paragraph 6–3 for soldering procedures.

(3) Pressure test, evacuate, and recharge the refrigerant system (para 6–5).

CHAPTER 6

REPAIR INSTRUCTIONS

6–1. General

The air conditioner, after it is started, is automatic in operation. The relationship of the automatic components, controls, and instruments, is explained in the operation analysis for maintenance of the air conditioner (para 6–2). A wiring diagram (fig. 1–4) and refrigerant flow diagram (fig. 6–1) are included to assist in the maintenance of the electrical components, wiring harness, wire leads, and refrigerant components.

Warning: **Disconnect the air conditioner from the power source before performing any maintenance on the components of the unit.**

6–2. Analysis of Operation

a. General. The type and degree of air conditioning provided by the unit is controlled by a five-position rotary selector switch and a thermostat.

(1) Placing the rotary selector switch in the HI-HEAT position actuates the blower motor and supplies electrical power to all six electric heaters. The temperature of the electric heaters is regulated by the thermostat. If th air temperature falls below the set point of the thermostat, the control contacts close, energizing the heater relay (K2) which supplies power to the heaters.

(2) Moving the selector switch to the LO-HEAT position presents the same control sequence but reduces the heating capacity of the unit by supplying power to only three electric heaters. A high temperature cutout switch protects against high temperature in the event of fan motor malfunction.

(3) The blower motor starts when the selector switch is placed in the VENTILATE position.

(4) The pressure equalizer solenoid valve closes at the time the rotary selector switch (S1) is positioned to COOL. It remains energized and closed as long as the rotary selector switch remains in the COOL position.

(5) In the COOL position, the blower motor is in operation and the compressor motor contactor is energized, after a thirty-second time delay, through the contacts of the thermostat. The energized contactor supplies power to the compressor through the closed contacts of the circuit breaker. After the blower motor and compressor have started, the flow within the refrigerant circuit is controlled by the thermostat. Sensing a rise in the air temperature above the set point, the thermostat opens its contacts, deenergizing the compressor bypass solenoid valve (13, fig. 6–1). This positions the valve for cooling service. Sensing a fall in the air temperature below the set point, the contacts of the thermostat close, energizing the valve (13). This positions the valve for bypass service.

b. Cooling Cycle of Operation. The blower motor and compressor run continuously, whether the thermostat is calling for cooling or not, when the unit is adjusted to operate on the cooling cycle of operation. This feature provides a constant electrical load thus preventing voltage fluctuations within the system.

c. Bypass Cycle of Operation. When the conditioned air temperature falls below the thermostat setting, the circuit which controls the solenoid valve (13) is energized, causing:

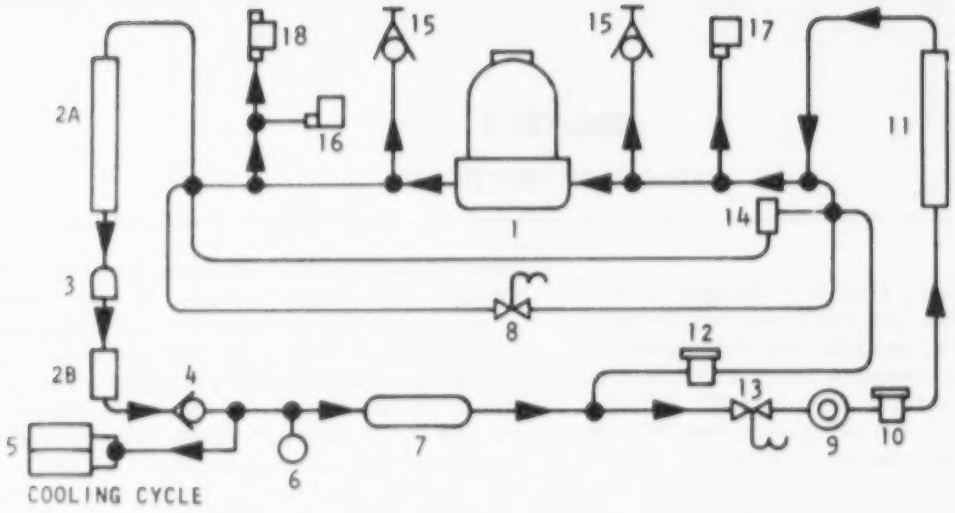
(1) The compressor bypass solenoid valve (13) to close, stopping the flow of refrigerant to the evaporator coil, thus stopping the cooling function completely.

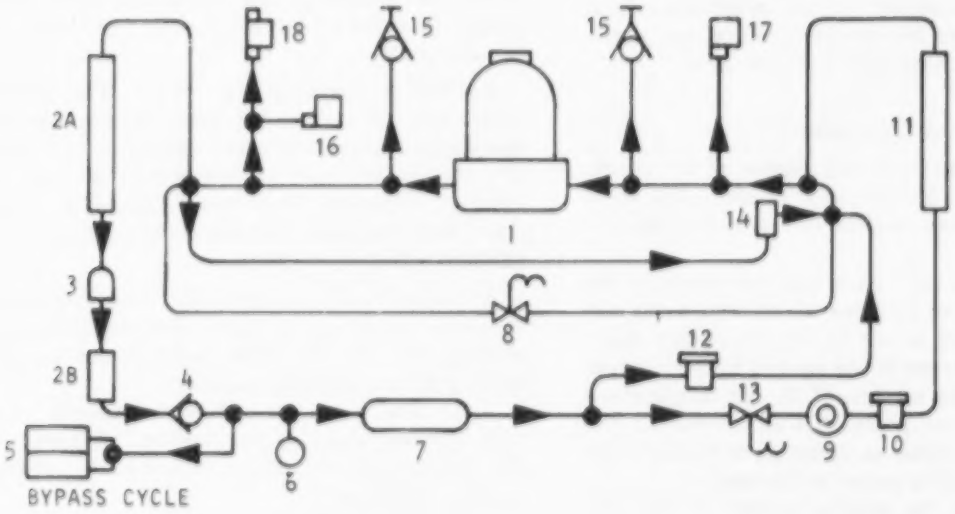
(2) The system then goes into bypassing a major part of the compressed refrigerant vapor directly back to the suction side of the compressor.

(3) The bypass expansion valve will then modulate a small amount of liquid refrigerant into the suction tubing.

(4) To prevent frost from forming on the evaporator, a back pressure regulating valve is provided to prevent the suction pressure from decreasing to a pressure which corresponds to a temperature of less than 32° F.

d. Heating Operation. Placing the selector switch in the LO-HEAT position actuates half of the evaporator heaters mounted in the conditioned air stream, directly behind the evaporator coil. When the selector switch is placed in the





1 COMPRESSOR
2A COIL, CONDENSER
2B SUBCOOLER
3 RECEIVER
4 VALVE, CHECK
5 TANK
6 VALVE, PRESSURE RELIEF
7 DEHYDRATOR, DESICCANT
8 VALVE, SOLENOID, PRESSURE EQUALIZER
9 GLASS, SIGHT
10 VALVE, EXPANSION, EVAPORATOR
11 COIL, EVAPORATOR
12 VALVE, EXPANSION, COMPRESSOR BYPASS
13 VALVE, SOLENOID, COMPRESSOR BYPASS
14 REGULATOR, FLUID PRESSURE
15 VALVE, SERVICE WITH CAP
16 SWITCH, PRESSURE, FAN SPEED
17 SWITCH, LOW PRESSURE CUTOUT
18 SWITCH, HIGH PRESSURE CUTOUT

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Figure 6-1. Refrigerant flow diagram.

HI-HEAT position, the remaining heaters are energized, providing maximum heating capacity (12,000 BTUH).

6–3. Repair Procedures

a. If the system must be opened for repair or replacement of parts, open the suction service valve and relieve the system pressure. Connect a hose line to the suction service valve and purge the refrigerant to an outside area.

b. After purging the system, allow the tubing to warm to the ambient temperature before opening the system; this delay will help prevent the formation of condensation on the inside walls of the tubing. Plug or cap all openings as a part is removed to minimize the entry of dirt and moisture.

c. Use a silver solder on all soldered connections. Easy-Flo silver solder (or equivalent) with a 50 percent silver capacity and a melting point of approximately 1160° F is recommended. Continually pass dry nitrogen through the tubing or connections being soldered to prevent formation of harmful copper oxides.

d. No metal contact on capillary tubes is allowable; use tape to prevent such contact.

6–4. Fan Motor

a. On-Equipment Testing. Before removing the motor for replacement, test the motor windings for any opens, grounds, and resistance tolerances.

(1) Disconnect electrical connector from motor.

(2) Check for continuity across each combination of two motor terminals. Lack of continuity indicates an open winding.

(3) Place one probe of the continuity tester against the motor housing and the other probe against each of the motor terminals, one at a time. If continuity is indicated between any terminal and the housing, the motor is defective.

(4) Connect the motor to a 208V, 3-phase, 60 Hz power source. Use a clampon or inseries type ammeter and measure the amperage in each of the motor leads. Amperage should be 4.2 amps in each lead.

b. Removal. Refer to paragraph 3–36 and remove the motor.

c. Disassembly. Refer to figure 6-2 and disassemble the motor.

d. Testing.

(1) *Overload protector.* Disconnect the electrical leads from the overload protector (fig. 6–2). Test the protector for continuity; if continuity does not exist, replace the overload protector.

(2) *Motor bench test.* Perform the growler tests on the stator as instructed in TM 5–764. Replace a defective stator.

e. Cleaning, Inspection, and Repairs.

(1) Clean all parts with a cloth dampened in approved cleaning solvent.

(2) Inspect stator housing for cracks, breaks, or other defects. Replace a damaged or defective housing.

(3) Inspect bearings for pits, scoring, wear, and out-of-round. Replace a damaged or defective housing.

(4) Inspect the rotor shaft for cracks, wear, or misalinement. Replace a damaged or defective rotor.

(5) Inspect the rotor for cracks, breaks, and damaged laminations. Replace damaged rotor.

(6) Replace stator if it does not meet test standards (*d*, above).

(7) Refer to TM 5–764 for motor repair instructions.

f. Reassembly. Refer to figure 6–2 and reassemble the motor.

g. Installation. Refer to paragraph 3–36 and install the fan motor.

6–5. Refrigerant System Servicing

Warning: **Avoid bodily contact with liquid refrigerant and avoid inhaling refrigerant gas. Be especially careful that refrigerant does not come in contact with the eyes. In case of refrigerant leaks, ventilate the area immediately.**

a. Testing Refrigerant System for Leaks.

(1) *Halide torch leak detector method.* The preferred method of testing for refrigerant system leaks is by using a halide torch. The halide torch exploring tube is passed over all joints, couplings, and valves. A refrigerant leak will cause the flame of the torch to change from blue to green. If the leak is large, the flame will be dense blue with a reddish tip. A very large leak may extinguish the flame. Mark all spots where leaks are noticed. Drain the refrigerant system, repair the leak, and pressure test the system.

(2) *Soap solution method.* While operating the air conditioner, brush all possible points of leakage with soap solution and watch for bubbles. Wipe off soap solution and mark leaks. Drain the refrigerant system; repair leaks and pressure test the system.

b. Draining. Refer to figure 6–3 and drain the refrigerant system.

c. Pressure Testing and Evacuating. Refer to figure 6–4 and pressure test and evacuate the refrigerant system.

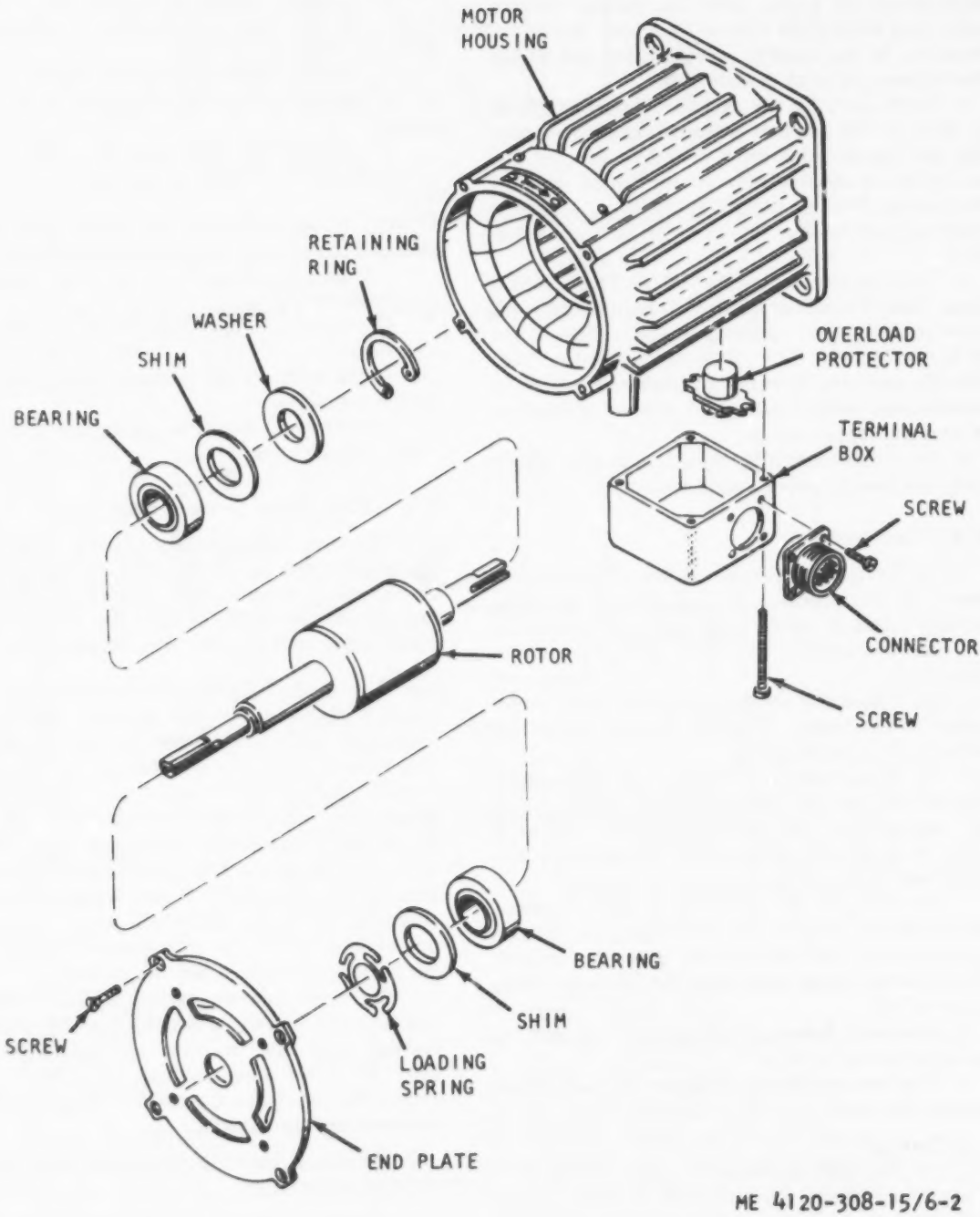
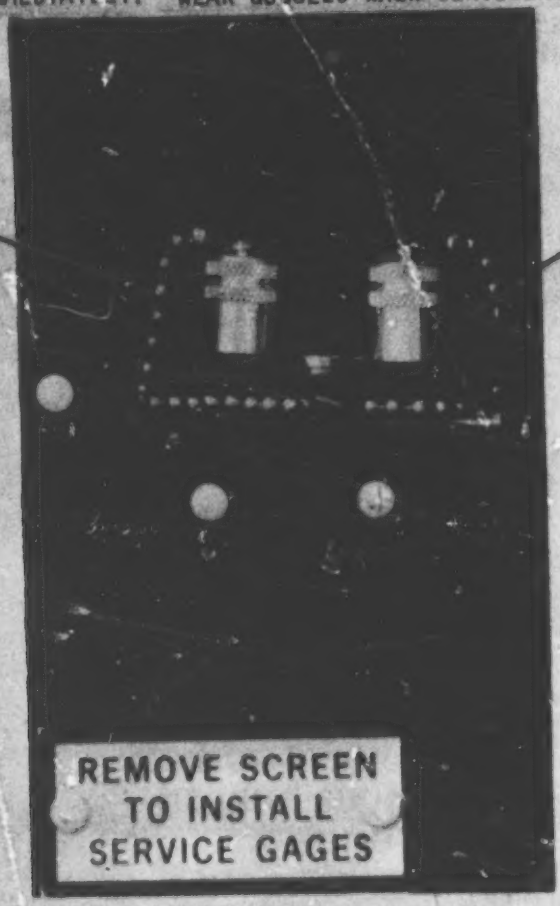


Figure 6-2. Motor, disassembly and reassembly.

WARNING: AVOID BODILY CONTACT WITH LIQUID REFRIGERANT AND AVOID INHALING REFRIGERANT GAS. BE ESPECIALLY CAREFUL THAT REFRIGERANT DOES NOT CONTACT THE EYES. IN CASE OF REFRIGERANT LEAKS, VENTILATE THE AREA IMMEDIATELY. WEAR GOGGLES WHEN SERVICING REFRIGERANT SYSTEM.



STEP 1. REFER TO FIGURE 3-6 AND REMOVE THE FRESH AIR INLET SCREEN.

STEP 2. REMOVE CAP AND CONNECT A HOSE SECURELY TO THE SUCTION SERVICE VALVE AND LOOSELY TO AN EMPTY REFRIGERANT TANK. DISCHARGE REFRIGERANT TO AN OUTSIDE AREA.

NOTE: HOSES MUST HAVE VALVE CORE DEPRESSORS.

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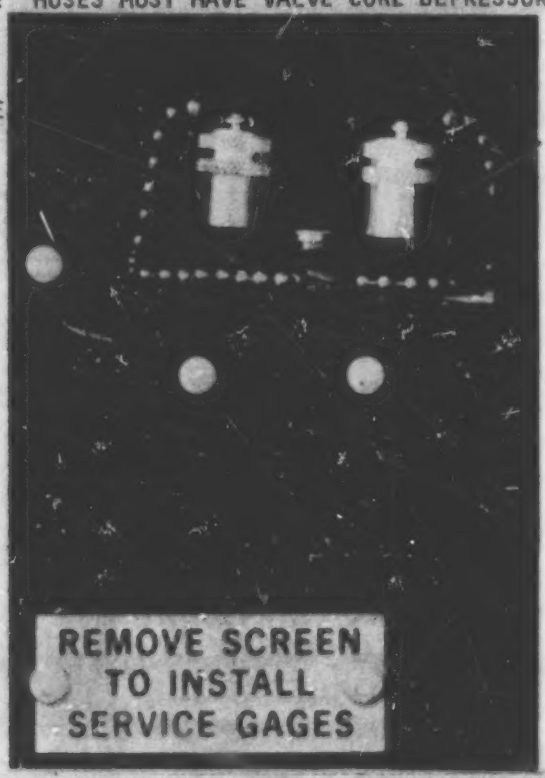
Figure 6-3. Draining the refrigerant charge.

STEP 1. REFER TO FIGURE 3-6 AND REMOVE THE FRESH AIR INLET SCREEN.

STEP 2. REMOVE CAPS FROM SERVICE VALVES.

STEP 3. CONNECT HOSE FROM DISCHARGE PRESSURE GAUGE ON MANIFOLD LOOSELY TO DISCHARGE SERVICE VALVE. PURGE HOSE AND TIGHTEN CONNECTION AT SERVICE VALVE.

NOTE: HOSES MUST HAVE VALVE CORE DEPRESSORS.



WARNING: AVOID BODILY CONTACT WITH LIQUID REFRIGERANT AND AVOID INHALING REFRIGERANT GAS. BE ESPECIALLY CAREFUL THAT REFRIGERANT DOES NOT CONTACT THE EYES. IN CASE OF REFRIGERANT LEAKS, VENTILATE THE AREA IMMEDIATELY. WEAR GOGGLES WHEN SERVICING REFRIGERANT SYSTEM.

ME 4120-308-15/6-4 (1)

Figure 6-4. Pressure testing and evacuating the refrigerant system.

d. Charging. Refer to figure 6–5 and 6–6 and charge the refrigerant system.

6–6. System Operating Pressure Test

An important part of diagnosing the air conditioner refrigerant system troubles to effect proper repair procedures is the performance of a system operating pressure test. This test should be performed under controlled conditions at the ambient temperatures specified in table 5–2. The system operating pressure test is performed as follows:

a. Refer to figure 6–4 and remove the suction and discharge service valve caps.

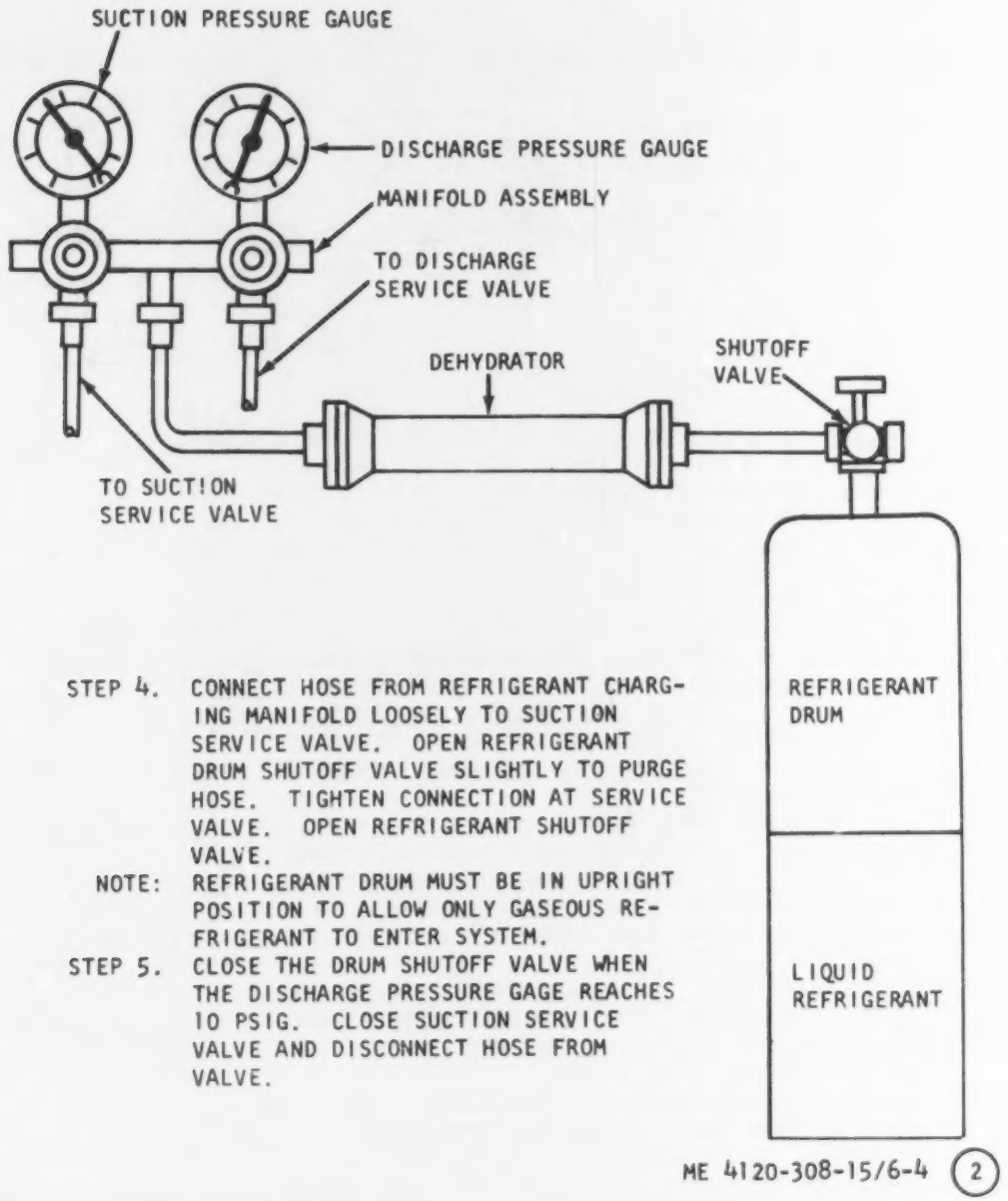

SUCTION PRESSURE GAUGE
DISCHARGE PRESSURE GAUGE
MANIFOLD ASSEMBLY
TO DISCHARGE SERVICE VALVE
DEHYDRATOR
SHUTOFF VALVE
TO SUCTION SERVICE VALVE
STEP 4. CONNECT HOSE FROM REFRIGERANT CHARGING MANIFOLD LOOSELY TO SUCTION SERVICE VALVE. OPEN REFRIGERANT DRUM SHUTOFF VALVE SLIGHTLY TO PURGE HOSE. TIGHTEN CONNECTION AT SERVICE VALVE. OPEN REFRIGERANT SHUTOFF VALVE.
NOTE: REFRIGERANT DRUM MUST BE IN UPRIGHT POSITION TO ALLOW ONLY GASEOUS REFRIGERANT TO ENTER SYSTEM.
STEP 5. CLOSE THE DRUM SHUTOFF VALVE WHEN THE DISCHARGE PRESSURE GAGE REACHES 10 PSIG. CLOSE SUCTION SERVICE VALVE AND DISCONNECT HOSE FROM VALVE.
REFRIGERANT DRUM
LIQUID REFRIGERANT
ME 4120-308-15/6-4 (2)

Figure 6–4—Continued.

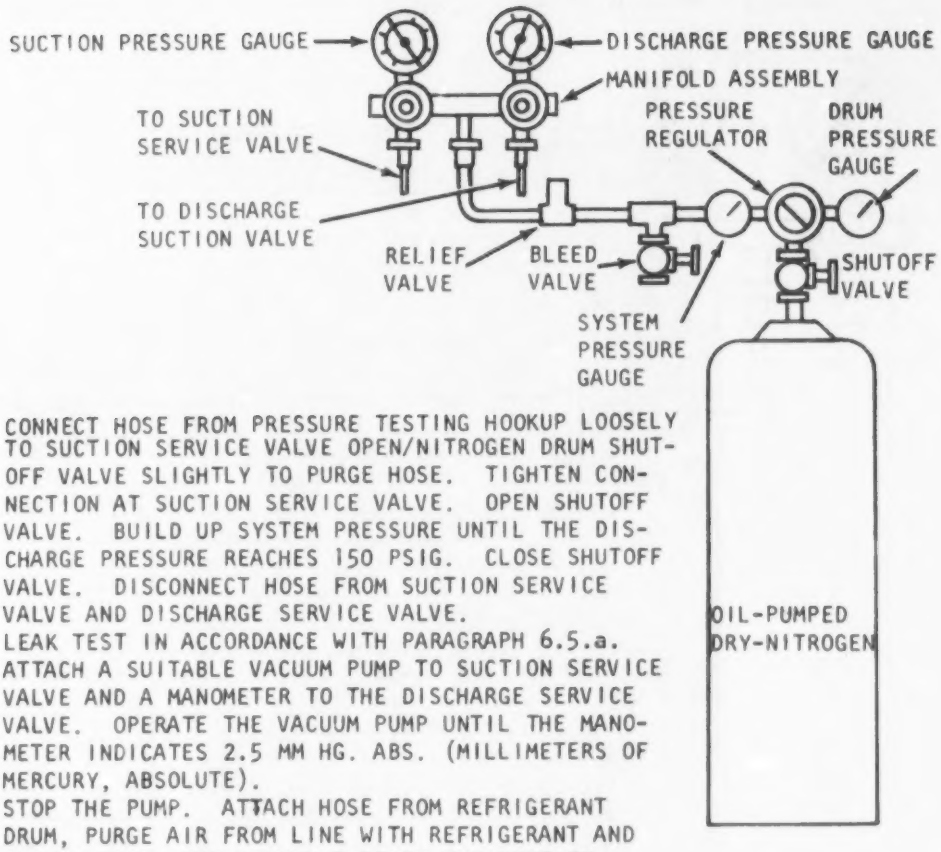
b. Connect a 0 to 400 psi pressure gauge to suction service valve loosely, using a hose with valve core depressor. Purge hose and tighten connection at service valve.

c. Connect a 0 to 600 psi pressure gauge to discharge service valve loosely, using a hose with valve core depressor. Purge hose and tighten connection at service valve.

d. Operate air conditioner with rotary selector switch (fig. 2–6) set to COOL and thermostat (fig. 2–6) set to maximum DECREASE.

e. Check indications on suction and discharge pressure gauges.

f. Compare gauge indications with the normal operating pressures listed in table 5–2. If normal operating pressures are not indicated, refer to



STEP 6. CONNECT HOSE FROM PRESSURE TESTING HOOKUP LOOSELY TO SUCTION SERVICE VALVE OPEN/NITROGEN DRUM SHUTOFF VALVE SLIGHTLY TO PURGE HOSE. TIGHTEN CONNECTION AT SUCTION SERVICE VALVE. OPEN SHUTOFF VALVE. BUILD UP SYSTEM PRESSURE UNTIL THE DISCHARGE PRESSURE REACHES 150 PSIG. CLOSE SHUTOFF VALVE. DISCONNECT HOSE FROM SUCTION SERVICE VALVE AND DISCHARGE SERVICE VALVE.

STEP 7. LEAK TEST IN ACCORDANCE WITH PARAGRAPH 6.5.a.

STEP 8. ATTACH A SUITABLE VACUUM PUMP TO SUCTION SERVICE VALVE AND A MANOMETER TO THE DISCHARGE SERVICE VALVE. OPERATE THE VACUUM PUMP UNTIL THE MANOMETER INDICATES 2.5 MM HG. ABS. (MILLIMETERS OF MERCURY, ABSOLUTE).

STEP 9. STOP THE PUMP. ATTACH HOSE FROM REFRIGERANT DRUM, PURGE AIR FROM LINE WITH REFRIGERANT AND SLOWLY BREAK THE VACUUM THROUGH THE SUCTION SERVICE VALVE UNTIL 760 MM HG ABS IS READ ON MANOMETER. REMOVE LINE FROM SUCTION SERVICE VALVE.

STEP 10. REMOVE REFRIGERANT DRUM AND CONNECT VACUUM PUMP TO SUCTION SERVICE VALVE. PURGE AIR FROM HOSE AND START PUMP. OPERATE PUMP UNTIL MANOMETER AGAIN REACHES 2.5 MM HG ABS.

STEP 11. REMOVE LINE FROM SUCTION SERVICE VALVE AND ALLOW UNIT TO STAND UNDER VACUUM FOR APPROXIMATELY 12 HOURS. IF NO NOTICABLE RISE IN PRESSURE OCCURS, THE SYSTEM IS READY FOR CHARGING. REMOVE VACUUM PUMP AND MANOMETER. INSTALL CAPS.

NOTE: RISE IN PRESSURE WILL BE INFLUENCED BY AMBIENT TEMPERATURE. MAKE SURE VACUUM IN SYSTEM IS COMPLETELY RELIEVED BEFORE CHARGING.

NOTE: WHEN UNIT IS OPERATING DO NOT OPEN BOTH MANIFOLD VALVES AT THE SAME TIME.

ME 4120-308-15/6-4 (3)

Figure 6-4—Continued.

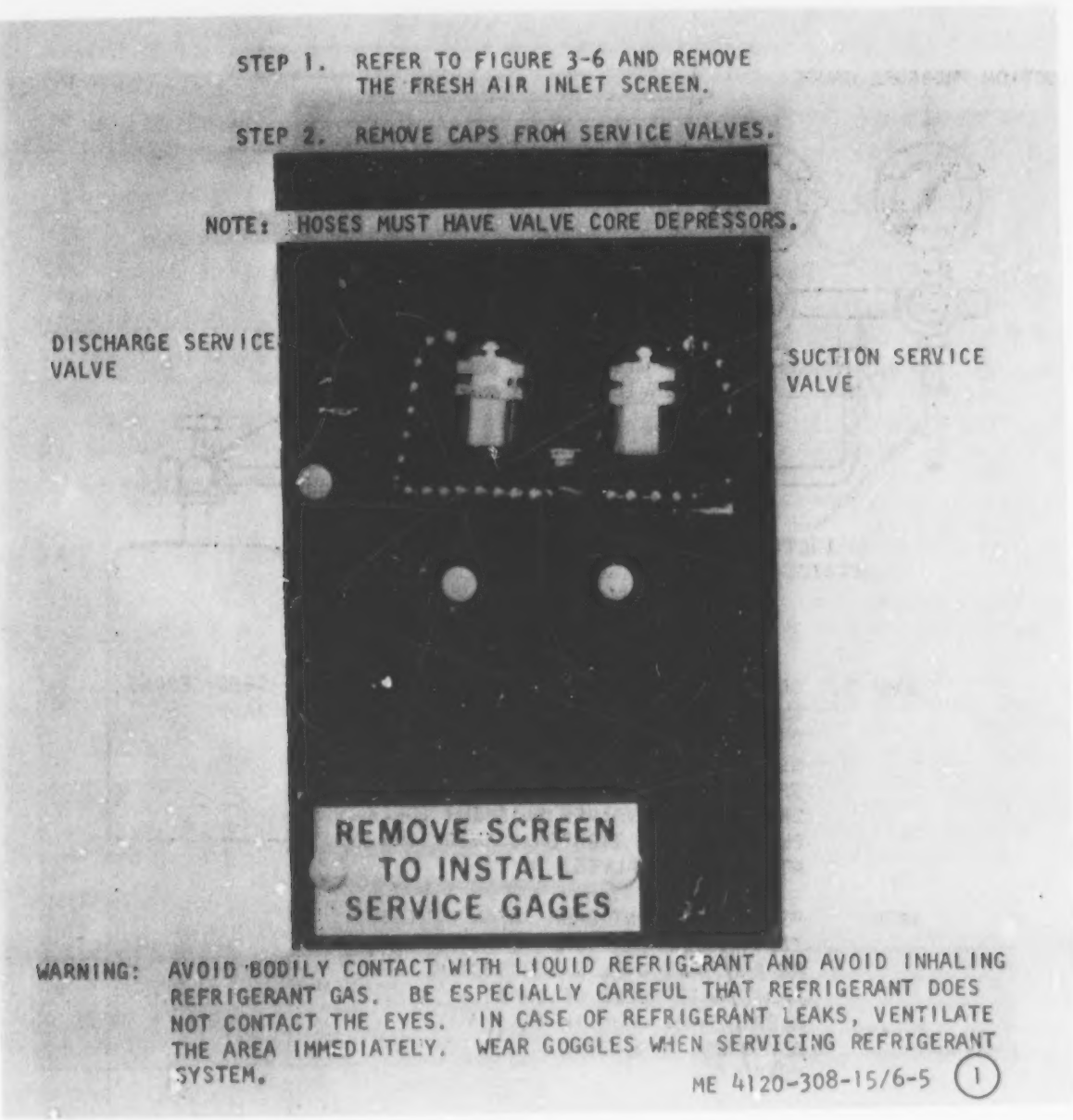

STEP 1. REFER TO FIGURE 3-6 AND REMOVE THE FRESH AIR INLET SCREEN.
STEP 2. REMOVE CAPS FROM SERVICE VALVES.
NOTE: HOSES MUST HAVE VALVE CORE DEPRESSORS.
DISCHARGE SERVICE VALVE
SUCTION SERVICE VALVE
REMOVE SCREEN TO INSTALL SERVICE GAGES
WARNING: AVOID BODILY CONTACT WITH LIQUID REFRIGERANT AND AVOID INHALING REFRIGERANT GAS. BE ESPECIALLY CAREFUL THAT REFRIGERANT DOES NOT CONTACT THE EYES. IN CASE OF REFRIGERANT LEAKS, VENTILATE THE AREA IMMEDIATELY. WEAR GOGGLES WHEN SERVICING REFRIGERANT SYSTEM.
ME 4120-308-15/6-5
1

Figure 6-5. Charging the refrigerant system.

troubleshooting procedures contained in table 5-1.

g. Remove pressure gauges and hoses and install suction and discharge service valve caps.

6-7. Compressor Motor Burnout Cleanup Procedure

a. General.

(1) The scope of this procedure pertains to hermetic compressors.

(2) Experience has demonstrated that after a hermetic motor burnout, the system must be cleaned thoroughly to remove all contaminants otherwise, a repeat burnout will occur. Failure to follow these instructions as quickly as possible will result in an excessive risk of a repeat burnout, and damage to other system components.

b. Cleanup Procedure.

(1) Make certain that a burnout has occurred. A motor that fails to start may be due to improper voltage or a malfunction of the compressor start relay, or a compressor mechanical fault.

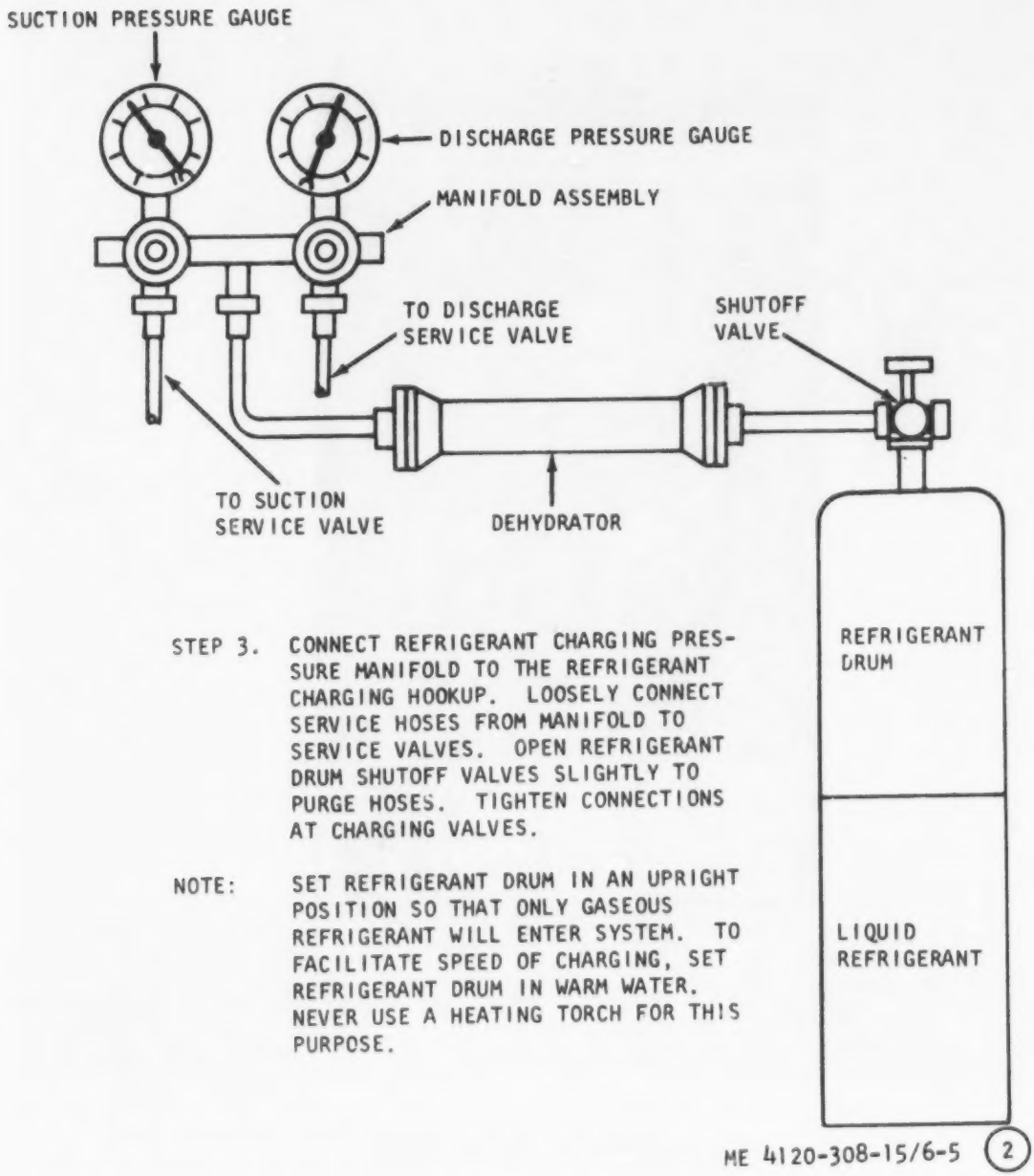

SUCTION PRESSURE GAUGE
DISCHARGE PRESSURE GAUGE
MANIFOLD ASSEMBLY
TO DISCHARGE SERVICE VALVE
SHUTOFF VALVE
TO SUCTION SERVICE VALVE
DEHYDRATOR
STEP 3. CONNECT REFRIGERANT CHARGING PRESSURE MANIFOLD TO THE REFRIGERANT CHARGING HOOKUP. LOOSELY CONNECT SERVICE HOSES FROM MANIFOLD TO SERVICE VALVES. OPEN REFRIGERANT DRUM SHUTOFF VALVES SLIGHTLY TO PURGE HOSES. TIGHTEN CONNECTIONS AT CHARGING VALVES.
NOTE: SET REFRIGERANT DRUM IN AN UPRIGHT POSITION SO THAT ONLY GASEOUS REFRIGERANT WILL ENTER SYSTEM. TO FACILITATE SPEED OF CHARGING, SET REFRIGERANT DRUM IN WARM WATER. NEVER USE A HEATING TORCH FOR THIS PURPOSE.
REFRIGERANT DRUM
LIQUID REFRIGERANT
ME 4120-308-15/6-5
2

Figure 6–5—Continued.

(*a*) To check for proper voltage, turn off the main disconnect switch so that all power is off.

(*b*) Remove the front access cover (para 3–20).

(*c*) Remove the compressor leads at the compressor side of the compressor start relay.

(*d*) Close the disconnect switch to energize the control circuit.

(*e*) Check for voltage on all lines at both the line and load side of the compressor start relay.

Note. Before checking the compressor motor,

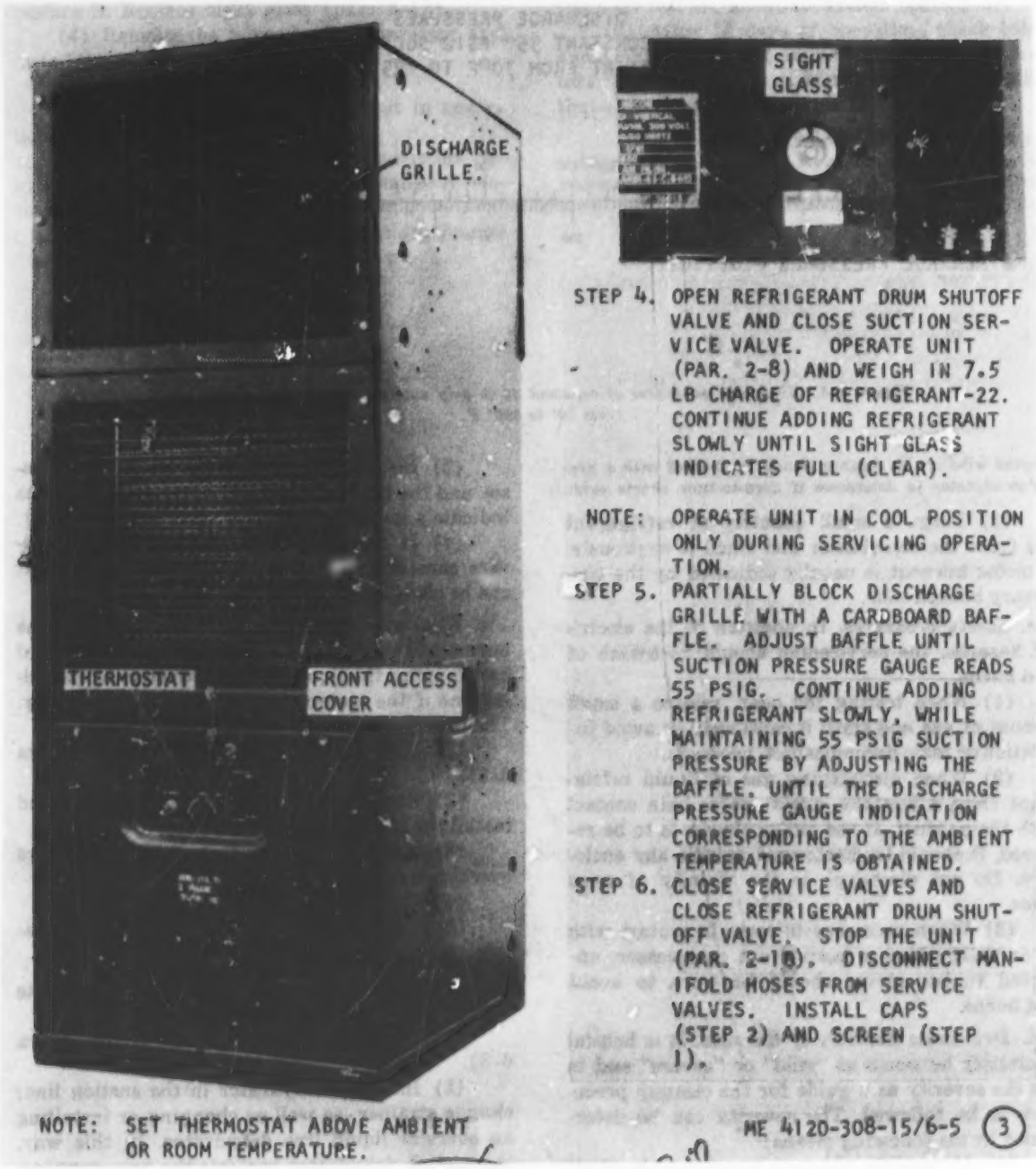

DISCHARGE GRILLE.
SIGHT GLASS
THERMOSTAT
FRONT ACCESS COVER
NOTE: SET THERMOSTAT ABOVE AMBIENT OR ROOM TEMPERATURE.
STEP 4. OPEN REFRIGERANT DRUM SHUTOFF VALVE AND CLOSE SUCTION SERVICE VALVE. OPERATE UNIT (PAR. 2-8) AND WEIGH IN 7.5 LB CHARGE OF REFRIGERANT-22. CONTINUE ADDING REFRIGERANT SLOWLY UNTIL SIGHT GLASS INDICATES FULL (CLEAR).
NOTE: OPERATE UNIT IN COOL POSITION ONLY DURING SERVICING OPERATION.
STEP 5. PARTIALLY BLOCK DISCHARGE GRILLE WITH A CARDBOARD BAFFLE. ADJUST BAFFLE UNTIL SUCTION PRESSURE GAUGE READS 55 PSIG. CONTINUE ADDING REFRIGERANT SLOWLY, WHILE MAINTAINING 55 PSIG SUCTION PRESSURE BY ADJUSTING THE BAFFLE, UNTIL THE DISCHARGE PRESSURE GAUGE INDICATION CORRESPONDING TO THE AMBIENT TEMPERATURE IS OBTAINED.
STEP 6. CLOSE SERVICE VALVES AND CLOSE REFRIGERANT DRUM SHUTOFF VALVE. STOP THE UNIT (PAR. 2-10). DISCONNECT MANIFOLD HOSES FROM SERVICE VALVES. INSTALL CAPS (STEP 2) AND SCREEN (STEP 1).
ME 4120-308-15/6-5
3

Figure 6-5—Continued.

make sure the compressor is cool to the touch. Otherwise, a false indication may be obtained due to internal motor protectors being open.

(*f*) Check the compressor motor to see if it is electrically grounded or open. A 500-volt magger or an ohmeter can be used for making the test. Typical magger readings are 5 megohms for R-22. If no fault is found and if the normal values for winding resistance are known, check and record stator currents for balance by the wattmeter or ohmeter method. Use rated meters.

Note. A slight unbalance in stator currents may occur. An appreciable unbalanced phase indicates a

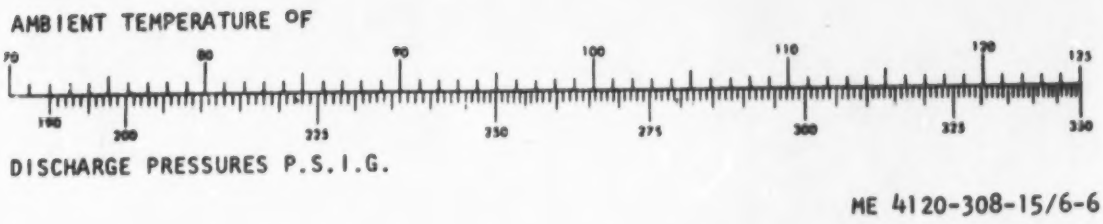


Figure 6–6. Discharge pressures at constant 55 lb psig suction, ambient temperatures from 70° to 120° F.

shorted winding. Resistance should be checked with a precision ohmeter to determine if turn-to-turn shorts exist.

(2) Purge a small quantity of refrigerant gas from the compressor and smell it cautiously. A motor burnout is usually indicated by the customary burned odor.

c. Safety Measures. In addition to the electrical hazards, the serviceman should be aware of acid burns.

(1) When testing for odor, release a small amount of gas and smell it cautiously to avoid inhalation of toxic decomposition products.

(2) When discharging gas or liquid refrigerant from a burnout, avoid eye or skin contact with the product. If the entire charge is to be removed, it should be discharged outside any enclosure. Do not discharge in the vicinity of open flame.

(3) When necessary to come in contact with oil or sludge from a burned out compressor, approved rubber gloves should be worn to avoid acid burns.

d. Determine Severity of Burnout. It is helpful to classify burnouts as "mild" or "severe" and to use the severity as a guide for the cleanup procedure to be followed. The severity can be determined by the following means:

(1) If possible, obtain a small sample of oil from the burned out compressor and analyze it, using an acid test kit. Excessive acidity (over .05 acid number) in the oil indicates a severe burnout. This is the best method of determining the severity of burnout. Discoloration of the oil may also indicate a severe burnout.

(2) Discharge a small amount of refrigerant and smell it. A characteristic burned odor indicates a severe burnout.

(3) Inspect the suction line at the compressor and the liquid line dryer. Any carbon deposits indicate a severe burnout.

(4) If none of the above indications of severe contamination are found, then the burnout can be classified as mild.

e. Cleanup After a Mild Burnout. When the burnout is mild, the contaminant can be removed by changing the liquid line dehydrator, or installing one if the system did not have one originally. The procedure to follow is:

(1) Discharge the refrigerant system (para 6–3).

(2) Remove the burned out compressor and install the replacement (para 5–23).

(3) Remove the dehydrator and install an oversize replacement dehydrator.

(4) Evacuate the system (para 6–5).

(5) Recharge the system and put in operation (para 6–5).

f. Cleanup After a Severe Burnout. Complete cleaning of the system is required.

(1) Discharge the refrigerant system (para 6–3).

(2) Install a dehydrator in the suction line; change strainer, as well as changing or installing an oversize liquid line dehydrator. In this way, the suction dehydrator protects the new compressor from any contaminants that may remain in the system. Leaving a permanent type dehydrator in the suction line allows the serviceman to complete the cleanup at one time. A pressure tap should be installed upstream of the suction dehydrator so that the pressure drop from the tap to the service valve can be checked after several hours of operation. A pressure drop in excess of 3 psi is generally considered excessive.

(3) Check the expansion device and clean or replace it. Replace sight glass (para 5–12).

(4) Remove the burned out compressor and install the replacement.

(5) Evacuate the system.

(6) Recharge the system and put in operation.

(7) Check pressure drop across suction dehydrator after one-hour operation. Change if necessary and evacuate system (para 6–5).

(8) After 8 to 24 hours' operation, change suction dehydrator, check odor and color of oil or test with test kit. Evacuate system (para 6–5).

(9) After 14 days of operation, check color and acidity of oil. If required, change dehydrators. Before cleanup is complete, it is essential that oil is clean and no acid is present.

Note. The new compressor should not be used for pulling a vacuum. Pull a high vacuum (less than 500 microns) for several hours. Allow the system to stand several hours to be sure the vacuum is maintained.

APPENDIX A

REFERENCES

A–1. Fire Protection

TM 5–4200–200–10	Hand Portable Fire Extinguishers for Army Users

A–2. Painting

TM 9–213	Painting Instructions for Field Use

A–3. Radio Suppression

TM 11–483	Radio Interference Suppression

A–4. Maintenance

TM 38–750	Army Equipment Record Procedures
TM 5–4120–308–15	Operator, Organizational, Direct Support, General Support and Depot Maintenance Manual
TM 5–4120–308–20P	Organizational Repair Parts and Special Tool Lists
TM 5–4120–308–35P	Direct Support, General Support and Depot Maintenance Repair Parts List
TM 5–764	Electric Motor and Generator Repair
TB 740–93–2	Preservation of USAMEC Mechanical Equipment for Shipment and Storage
TM 740–90–1	Administrative Storage of Equipment

APPENDIX B

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

B–1. Scope

This appendix lists items which accompany the air conditioner or are required for installation, operation, or operator's maintenance.

B–2. General

This basic issue items list is divided into the following sections:

a. Basic Issue Items—Section II. A list of items which accompany the air conditioner and are required by the operator/crew for installation, operation, or maintenance.

b. Maintenance and Operating Supplies—Section III. Not applicable.

B–3. Explanation of Columns

The following provides an explanation of columns in the tabular list of basic issue items, section II.

a. Source, Maintenance, and Recoverability Codes (SMR).

(1) Source code indicates the source for the listed item. Source code is:

Code	Explanation
P	Repair parts which are stocked in or supplied from the GSA/DSA or Army supply system, and authorized for use at indicated maintenance categories.

(2) Maintenance code indicates the lowest category of maintenance authorized to install the listed item. The maintenance level code is:

Code	Explanation
C	Operator/crew

b. Federal Stock Number. This column indicates the Federal stock number assigned to the item and will be used for requisitioning purposes.

c. Description. This column indicates the Federal item name and any additional description of the item required. The abbreviation "w/e," when used as a part of the nomenclature, indicates the Federal stock number includes all armament, equipment, accessories, and repair parts issued with the item. A part number or other reference number is preceded by the applicable five-digit Federal supply code for manufacturers, in parentheses. Repair parts quantities included in kits, sets, and assemblies, are shown in front of the repair part name.

d. Unit of Measure (U/M). A two-character alphabetic abbreviation indicating the amount or quantity of the item upon which the allowances are based; e.g., ft, ea, pr, etc.

e. Quantity Incorporated in Unit. This column indicates the quantity of the item used in the assembly group. A "V" appearing in this column in lieu of a quantity indicates that a definite quantity cannot be indicated (e.g., shims, spacers, etc.).

f. Quantity Furnished With Equipment. This column indicates the quantity of an item furnished with the equipment.

g. Illustration. This column is divided as follows:

(1) *Figure number.* Indicates the figure number of the illustration in which the item is shown.

(2) *Item number.* Indicates the callout number used to reference the item in the illustration.

Section II. BASIC ISSUE ITEMS

(1) SMR code	(2) Federal stock number	(3) Description — Ref No. & mfr code / Useable on code	(4) Unit of meas	(5) Qty inc in unit	(6) Qty furn with equip	(7) Illustration (A) Fig. No.	(7) Illustration (B) Item No.
		GROUP 31—BASIC ISSUE ITEMS, MANUFACTURER INSTALLED					
		3100—BASIC ISSUE ITEMS, MANUFACTURER OR DEPOT INSTALLED					
PC	5220-559-9618	CASE: maintenance and operational manuals, cotton duck, water-repellent, mildew-resistant, MIL-B-11743B		1	1		
		Department of the Army Operator, Organizational, Direct and General Support and Depot Maintenance Manual TM 5-4120-308-15		1	1		
		GROUP 32—BASIC ISSUE ITEMS, TROOP INSTALLED					
		3200—BASIC ISSUE ITEMS, TROOP INSTALLED OR AUTHORIZED					
PC		BLOCKOFF PANEL ASSEMBLY (97403) 13215E9885		1	1		
PC		CONNECTOR, ELECTRIC (97403) 13217E7603		1	1		
PC		SOUND ATTENUATOR (97403) 13211E3798		1	1		

APPENDIX C

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

C–1. General

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the special tools and test equipment required for each maintenance function as referenced from section II.

d. Section IV contains supplemental instructions, explanatory notes and/or illustrations required for a particular maintenance function.

C–2. Explanation of Columns in Section II

a. Group Number, Column (1). The functional group is a numerical group set up on a functional basis. The applicable functional grouping indexes (obtained from TB 750–93–1, Functional Grouping Codes) are listed on the MAC (Maintenance Allocation Chart) in the appropriate numerical sequence. These indexes are normally set up in accordance with their function and proximity to each other.

b. Functional Group, Column (2). This column contains a brief description of the components of each functional group.

c. Maintenance Functions, Column (3). This column lists the various maintenance functions (A through K) and indicates the lowest maintenance category authorized to perform these functions. The symbol designations for the various maintenance categories are as follows:

C—Operator or crew
O—Organizational maintenance
F—Direct support maintenance
H—General support maintenance
D—Depot maintenance

The maintenance functions are defined as follows:

A—Inspect. To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.
B—Test. To verify serviceability and to detect electrical or mechanical failure by use of test equipment.
C—Service. To clean, to preserve, to charge, to paint, and to add fuel, lubricants, cooling agents, and air.
D—Adjust. To rectify to the extent necessary to bring into proper operating range.
E—Aline. To adjust specified variable elements of an item to bring to optimum performance.
F—Calibrate. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurements. Consists of the comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.
G—Install. To set up for use in an operational environment such as an emplacement, site, or vehicle.
H—Replace. To replace unserviceable items with serviceable assemblies, subassemblies, or parts.
I—Repair. To restore an item to serviceable condition. This includes, but is not limited to, inspection, cleaning, preserving, adjusting, replacing, welding, riveting, and strengthening.
J—Overhaul. To restore an item to a completely serviceable condition as prescribed by maintenance serviceability standards using the Inspect and Repair Only as Necessary (IROAN) technique.
K—Rebuild. To restore an item to a standard as nearly as possible to original or new condition in appearance, performance, and life expectancy. This is accomplished through complete disassembly of the item, inspection of all parts or components, repair or replacement of worn or unserviceable elements (items), using original manufacturing tolerances and specifications, and subsequent reassembly of the item.

d. Tools and Equipment, Column (4). This column is provided for referencing by code the special tools and test equipment (sec. III) required to perform the maintenance functions (sec. II).

e. Remarks, Column (5). This column is provided for referencing by code the remarks (sec. IV) pertinent to the maintenance functions.

C–3. Explanation of Columns in Section III

a. Reference Code. This column consists of a number and a letter separated by a dash. The number references the T&TE requirements column on the MAC. The letter represents the specific maintenance function the item is to be used with. The letter is representative of columns A through K on the MAC.

b. Maintenance Level. This column shows the lowest level of maintenance authorized to use the special tool or test equipment.

c. Nomenclature. This column lists the name or identification of the tool or test equipment.

d. Tool Number. This column lists the manufacturer's code and part number or Federal stock number of tools and test equipment.

C–4. Explanation of Columns in Section IV

a. Reference Code. This column consists of two letters separated by a dash, both of which are references to section II. The first letter references column (5) and the second letter references a maintenance function, column (3), A through K.

b. Remarks. This column lists information pertinent to the maintenance function being performed, as indicated on the MAC, section II.

Section II. MAINTENANCE ALLOCATION CHART

(1)	(2)	Maintenance functions (3)											(4)	(5)
		A	B	C	D	E	F	G	H	I	J	K		
Group No.	Functional group	Inspect	Test	Service	Adjust	Aline	Calibrate	Install	Replace	Repair	Rebuild	Overhaul	Tools and equipment	Remarks
15	FRAME													
1501	Frame Assembly													
	Base assembly	O							F					
	Casing assembly	O							F					
	Guard condenser fan	O							O					
18	BODY, CAB, HOOD, AND HULL													
1801	Panels													
	Baffle	O							F					
	Chain & damper control	O							O	O				
	Cover assemblies	O							O					
	Damper assembly	O							F					
	Grilles	O							O					
	Panel assemblies, front & top	O							O					
	Panel, back	O							F					
	Retainer assembly, filter	O							O					
22	BODY, CHASSIS OR HULL, AND ACCESSORY ITEMS													
2202	Accessory Items													
	Blockoff panel assembly	O							O					
	Connection assy, remote control	O							O					
	Connector, electrical	O							O					
	Sound attenuator	O							O					
2207	Winterization Equipment													
	Heater, electrical		O						F					
40	ELECTRIC MOTORS													
4000	Motor Assembly													
	Mount bushing	O							O					
	Motor assembly, blower		O						O	F				
	Bearing	F							F					
4001	Rotor Assemblies													
	Rotor, blower motor		F						F					
4002	Stator Assemblies													
	Stator, blower motor		F						F					
4005	Frame, Supports & Housings													
	Cover, stator housing								F					
	Endbell, housing								F					
	Housing, stator								F					
4006	Starting & Protective Devices													
	Protector overload		F						F					
	Relay, phase sequence		O						O					

(1) Group No.	(2) Functional group	Maintenance functions (3) A Inspect	B Test	C Service	D Adjust	E Aline	F Calibrate	G Install	H Replace	I Repair	J Rebuild	K Overhaul	(4) Tools and equipment	(5) Remarks
	Relay, time delay	--	O	--	--	--	--	--	O					
	Relay, armature	--	O	--	--	--	--	--	O					
	Relay, start, compressor	--	O	--	--	--	--	--	O					
	Relay, heater	--	O	--	--	--	--	--	O					
4009	Control Panels, Housing Cubicles													
	Box, junction	--	O	--	--	--	--	--	O					
	Connector, receptacle	--	O	--	--	--	--	--	O					
	Control panel assembly	--	O	--	--	--	--	--	O	O				
	Leads, electrical	--	O	--	--	--	--	--	O					
	Receptacle	--	O	--	--	--	--	--	O					
4010	Master or Auxiliary Control Assembly													
	Contactor, electrical	--	O	--	--	--	--	--	O					
4011	Circuit Breakers													
	Circuit breakers, compressor	--	O	--	--	--	--	--	O					
	Fuse	--	O	--	--	--	--	--	O					
4012	Switches													
	Switch, fan, two-speed	--	O	--	--	--	--	--	O					
	Switch, rotary	--	O	--	--	--	--	--	O					
	Switch, pressure	--	F	--	--	--	--	--	F					
	Switch, high temp cutout	--	O	--	--	--	--	--	O					
	Switch, high-pressure cutout	--	F	--	--	--	--	--	F					
	Switch, low-pressure cutout	--	F	--	--	--	--	--	F					
4017	Transformer: Rectifier													
	Rectifier	--	O	--	--	--	--	--	O					
	Transformer	--	O	--	--	--	--	--	O					
4018	Terminal Blocks													
	Connector, receptacle	--	O	--	--	--	--	--	O					
	Terminal blocks	--	O	--	--	--	--	--	O					
4019	Radio Interference Suppression													
	RFI components	--	O	--	--	--	--	--	O					
47	GAGES													
4702	Gages													
	Sight glass	O	--	--	--	--	--	--	F					
52	REFRIGERATION & AIR CONDITIONING COMPONENTS													
5200	Gas Compressor Assembly													
	Compressor assembly	--	F	F	--	--	--	--	H	--	--	--	.....	A
	Mount, resilient	O	--	--	--	--	--	--	F					
5217	Refrigerant Piping													
	Tubing, copper	--	F	--	--	--	--	--	F					
	Valve, check	--	F	--	--	--	--	--	F					
	Valve, pressure relief	--	--	--	--	--	--	--	F					
	Valve, regulating	--	F	--	--	--	--	--	F					
	Valve, service	--	--	--	--	--	--	--	F	F				
	Valve, solenoid	--	F	--	--	--	--	--	F	F				
5230	Condenser													
	Condenser assembly	O	F	O	--	--	--	--	F	--	--	--	.....	B
	Valve, expansion	--	F		F	--	--	--	F					
5235	Hydrating Equipment													
	Bracket, mounting	--	--	--	--	--	--	--	F					
	Dehydrator	--	--	--	--	--	--	--	F					
5241	Evaporator													
	Evaporator assembly	O	F	O	--	--	--	--	F	--	--	--	.....	C
	Tube, drain	--	--	O	--	--	--	--	O					
	Valve, expansion	--	F	--	F	--	--	--	F					
5243	Blower Assembly													
	Condenser fan	--	O	--	--	--	--	--	O					
	Evaporator fan	--	O	--	--	--	--	--	O					

(1) Group No.	(2) Functional group	Maintenance functions (3) A Inspect	B Test	C Service	D Adjust	E Aline	F Calibrate	G Install	H Replace	I Repair	J Rebuild	K Overhaul	(4) Tools and equipment	(5) Remarks
5244	Thermostatic Controls													
	Tank, accumulator	--	--	--	--	--	--	--	F					
	Receiver, refrigerant	--	--	--	--	--	--	--	F					
	Thermostat	--	O	--	--	--	--	--	O					
5245	Air Filters													
	Filters	--	--	O	--		--	--	O	--	--	--		D
	Mist eliminator	--	--	O	--	--	--	--	O	--	--	--		D

Section III. SPECIAL TOOL AND SPECIAL TEST EQUIPMENT REQUIREMENTS

Reference code	Maintenance level	Nomenclature	Tool number
		No special tools required	

Section IV. REMARKS

Reference code	Remarks
A—C	Service includes check of oil level and add oil using clean, fresh and dry oil of specification (FSN 9150-823-7905).
A—B	Testing includes the use of the Halide Torch Leak Detector, or a soap solution to detect leaks.
B—C	Clean with approved solvent; dry thoroughly.
C—C	Clean with approved solvent; dry thoroughly.
D—C	Clean with approved solvent; dry thoroughly, apply filter coating.

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By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

OFFICIAL:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

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COMPONENT REFERENCE LIST	
ELEC REF DESIG	DESCRIPTION
B1	COMPRESSOR, ROTARY
B2	MOTOR, FAN
CB1	CIRCUIT BREAKER, COMPRESSOR
CR1	RECTIFIER, SEMICONDUCTOR DEVICE
CR2	DIODE, SEMICONDUCTOR
E1	TERMINAL STUD (JUNCTION BOX GRD)
E2	TERMINAL STUD
	(CONTROL MODULE GRD)
E3	TERMINAL STUD (SYSTEM GRD)
FL1	FILTER, RFI
HR1-6	HEATER ELEMENT
J1	CONNECTOR, RECEPTACLE
J2	CONNECTOR, RECEPTACLE JUNCTION BOX
J3	CONNECTOR, RECEPTACLE
	JUNCTION BOX
J4	CONNECTOR, RECEPTACLE
	COMPRESSOR
J5	CONNECTOR, RECEPTACLE
	SOLENOID VALVE BY PASS
J6	CONNECTOR, RECEPTACLE
	SOLENOID VALVE EQUALIZER
J7	CONNECTOR, RECEPTACLE
	CONTROL MODULE
J8	CONNECTOR, RECEPTACLE, HEATER
J9	CONNECTOR, RECEPTACLE, FAN MOTOR
J10	CONNECTOR, RECEPTACLE, RFI FILTER
J11	CONNECTOR, RECEPTACLE, POWER INPUT
K1	RELAY, COMPRESSOR START
K2	RELAY, HEATER
K3	RELAY, TIME DELAY
K4	RELAY, ARMATURE
K5	RELAY, ARMATURE
K6	RELAY, PHASE SEQUENCE
L1	VALVE, SOLENOID
	COMPRESSOR BY PASS
L2	VALVE, SOLENOID
	PRESSURE EQUALIZER
P1	CONNECTOR, PLUG, RFI FILTER
P2	CONNECTOR, PLUG, JUNCTION BOX
P3	CONNECTOR, PLUG, JUNCTION BOX
P4	CONNECTOR, PLUG, COMPRESSOR
P5	CONNECTOR, PLUG
	SOLENOID VALVE BY PASS
P6	CONNECTOR, PLUG
	SOLENOID VALVE EQUALIZER
P7	CONNECTOR, PLUG, CONTROL MODULE
P8	CONNECTOR, PLUG, HEATER
P9	CONNECTOR, PLUG, FAN MOTOR
P10	CONNECTOR PLUG POWER INPUT
S1	SWITCH, ROTARY SELECTOR
S2	THERMOSTAT
S3	SWITCH, PRESSURE
S4	SWITCH, HEATER CUTOUT
S6	SWITCH, HIGH PRESSURE CUTOUT
S7	SWITCH, LOW PRESSURE CUTOUT
S8	SWITCH, TOGGLE, FAN MOTOR
T1	TRANSFORMER
TB1	TERMINAL BOARD JUNCTION BOX
TB2	TERMINAL BOARD JUNCTION BOX
XF1	FUSEHOLDER
XF2	FUSEHOLDER

Figure 1-4. Wiring diagram.

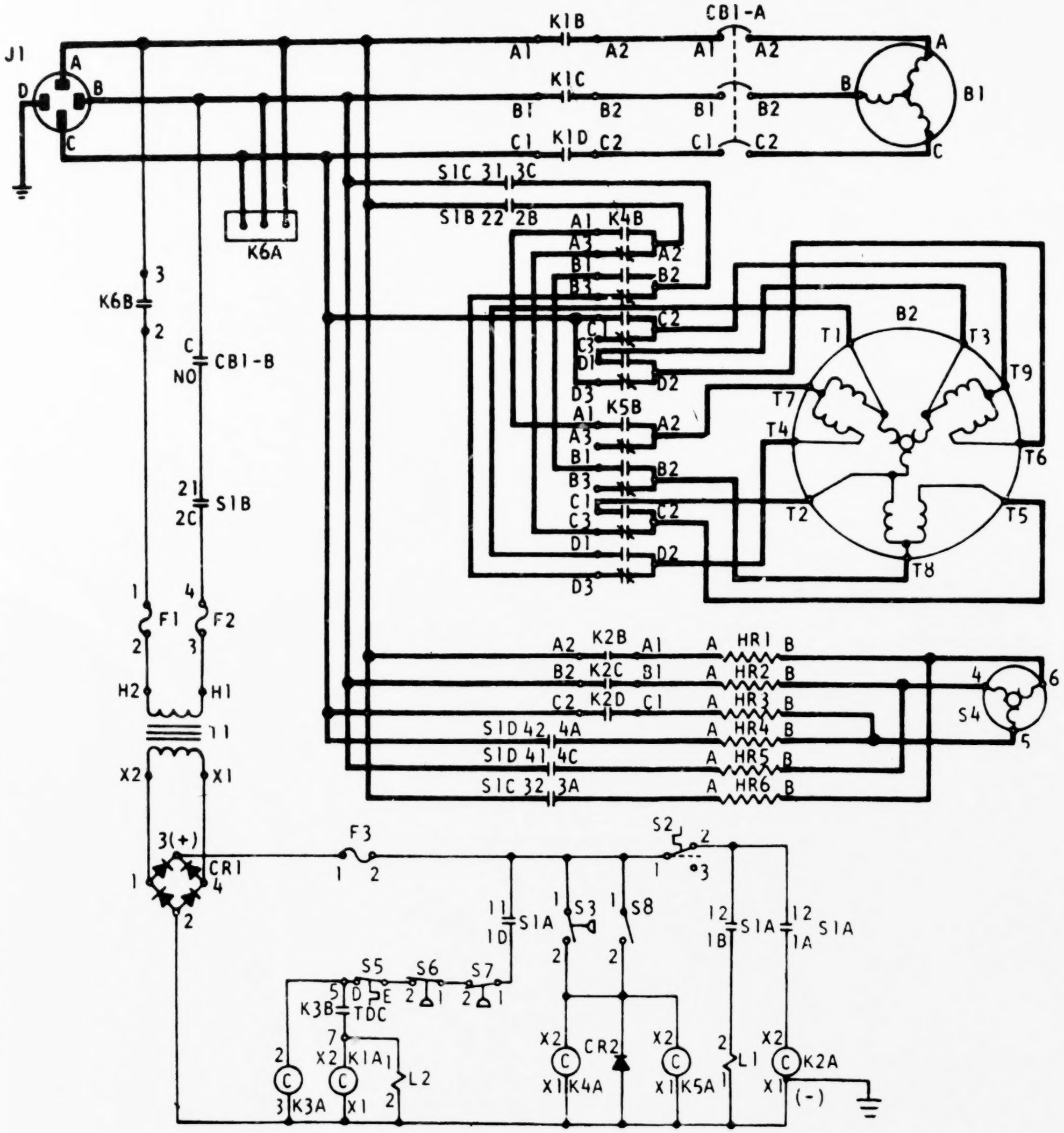

Figure 1-4—Continued.